

**State of California
California Environmental Protection Agency
AIR RESOURCES BOARD**

Summary of Phase II Assessment Study of Architectural Coatings

**EMMAQUA Accelerated Weathering
24 Month Real Time Exposure**

December 2003

Summary of Phase II Assessment Study of Architectural Coatings

As part of the 1999 amendments to Rule 1113 (Architectural Coatings), the South Coast Air Quality Management District (SCAQMD) funded a study to compare the performance of low-VOC and high-VOC coatings. SCAQMD solicited proposals to conduct side-by-side comparisons to address issues brought up by industry members regarding low-VOC coatings. A steering committee was formed to oversee the technical aspects of the study. This committee, called the Technical Advisory Committee (TAC), was comprised of representatives from the Air Resources Board (ARB), SCAQMD, academia, and the architectural coatings industry.

In 1998, the TAC selected National Technical Systems (NTS) as the contractor to carry out the Phase II Assessment Study of Architectural Coatings. The study consisted of a laboratory portion, an accelerated weathering portion, and an outdoor exposure portion. The three portions of this study took place between 1998 and 2002.

Coatings were selected from the industrial maintenance, non-flat, quick-dry enamel, primers, sealers and undercoaters, quick dry primers, sealers and undercoaters, and waterproofing sealers coating categories. The summaries in this report are broken into industrial maintenance, non-flat, and quick-dry enamel categories, based on what kind of topcoat was used in a given system. A system is a combination of coatings, usually a primer and topcoat, that work together to protect a substrate. The laboratory portion of the study is summarized in ARB'S 2000 Staff Report for the Suggested Control Measure (SCM) for Architectural Coatings. The results of the accelerated weathering and outdoor exposure portions of the study are summarized below. See Appendix A for a master list of the coatings and systems studied. See Appendix B for details of the testing results and ratings. All VOC contents in this attachment and in its appendices are in grams per liter, less water and less exempt solvents (g/L).

Accelerated Weathering

The accelerated weathering portion of the study was performed by Atlas Weathering Services Group. At their site in Phoenix, Arizona, Emmaqua (Equatorial Mount with Mirrors for Acceleration with Water) equipment was used to expose test panels to severe sunlight and deionized water spray for 85 days. These tests were completed in 2000.

The accelerated weathering portion of the study tested 20 industrial maintenance systems, and 12 non-flat systems. The non-flat systems consisted of 9 non-flats and 3 quick dry enamels. One of the non-flat systems had a quick dry primer

with a non-flat topcoat, and is classified as a non-flat system. Although there were 3 quick dry enamel systems, only one had a gloss reading of over 70 on a 60 degree meter (which is part of the definition of a quick dry enamel.) In addition, a non-flat coating had a gloss reading over 70 on a 60 degree meter and met the dry time definition for a quick dry enamel. Regardless, the coatings were not moved from their original categories. Of the 12 non-flat systems, one was not tested due to insufficient coating, and another did not have a known VOC content. Both were excluded from the final summary. Panels were tested in triplicate. The following tests were performed: Dry film thickness, pre-test and post-test gloss at 20, 60, and 85 degrees, pre-test and post-test CIE (*Commission Internationale de l'Eclairage* or International Commission on Illumination, a scale used to compare color), and pre-test and post-test yellowing. Visual comments were also noted at the end of the test.

Coatings Used in the Accelerated Weathering

Non-Flat and Quick Dry Enamel Systems

System Reference Designator	System Reference #	Resin Type	Primer VOC	Topcoat VOC
QDNFS-01	111-218	Alkyd/Alkyd	400	170
NFS-05	322-206	Acrylic	115	135
NFS-09	325-210	Acrylic	0	0
NFS-18	332-217	Acrylic	250	250
QDS-04	111-111-112	Alkyd/Alkyd	400/400	400
QDS-01	101-102	Alkyd/Alkyd	440	400
NFS-12	328-213	Alkyd/Acrylic	350	247
NFS-15	331-237	Acrylic	250	250
NFS-01	301-201	Copolymer Latex/Acrylic Latex	1	0
QDS-03	109-110	Alkyd	450	400
	310-215-215		NA	NA
	315-216		Unknown	Unknown

Note: Systems 310-215-215 did not have a sufficient amount of coating to be tested. System 315-216 did not have a known VOC value. Both systems were eliminated from the final summary.

Industrial Maintenance Systems

System Reference Designator	System Reference #	Resin Type	Primer VOC	Topcoat VOC
IMCS-17	930-931	Alkyd/Alkyd	419	385
IMCS-14	923-924	Alkyd/Alkyd	382	422
IMCS-15	925-925	Epoxy	395	395
IMCS-18	932-932	Epoxy	284	284
IMCS-13	922-922	Acrylic	231	231
IMCS-04	906-907-907	Acrylic/Acrylic	138	208/208
IMCS-05	908-909	Acrylic/Acrylic	60	120

IMCS-08	914-915-915	Butadiene-Epoxy/Urethane	0	0/0
IMCS-02	902-903	Epoxy Ester/Silicone	400	420
IMCS-06	910-911	Epoxy/Urethane	0	0
IMCS-11	919-919	Epoxy	170	170
IMCS-01	901-901	Siloxirane	108	108
IMCS-16	927-928-929	Epoxy/Epoxy/Urethane	320/275	295
IMCS-10	917-918	Alkyd/Urethane Alkyd	417	411
IMCS-07	912-913-913	Novolac	0	0/0
IMCS-19	933-932-934	Zinc/Epoxy/Urethane	282/284	388
IMCS-09	914-916-916	Butadiene-Epoxy/Epoxy	0	0/0
IMCS-12	920-921	Epoxy/Siloxane	288	120
IMCS-03	904-905-905	Zinc/Urethane	49	55/55
IMCS-20	902-010	Epoxy Ester/Urethane	400	420

Accelerated Weathering - Non-Flat Coatings			
Manufacturer	Number of Coatings in Study	Number of Times a Coating was Used	Notes
Benjamin Moore	2	2	
Dunn Edwards	4	4	
Frazee Industries	2	2	
Gal XE-2010	2	2	
ICI/Glidden	2	2	
Morewear	3	3	
PPA Technologies	2	0	Both coatings had an unknown VOC, and were not included in the final analysis.
Vista Paints	1	1	
Aquarius Coatings	1	0	One multicomponent coating, there was an insufficient amount of coating available.
EMU	1	1	
Masterchem	1	3	Coating was used twice on one panel, and once on another for a total of three applications.
Zehrung	2	1	One coating was to be used in a system that had an insufficient amount of coating to be tested.
Total	23	21	
Different Coatings Used: 9 Primers - All Single Component 10 Topcoat – All Single Component			

Accelerated Weathering – Industrial Maintenance Coatings		
Manufacturer	Number of Coatings in Study	Number of Times a Coating was Used
Advanced Polymer Sciences	1	2
Ameron Protective Coatings	2	2
Benjamin Moore	2	2
Coatings Resources Corp.	2	2

Dunn Edwards	3	4
Hart Polymers	3	6
ICI/Devoe	6	9
Sherwin Williams	4	6
Sigma Coatings	2	2
Superior Environmental Products	2	3
Tnemec	7	9
Total	34	47

Different Coatings Used:
 Primers – 9 single component, 9 multi component
 Midcoat – 2 multicomponent
 Topcoat – 10 single component, 10 multicomponent

Accelerated Weathering – Compliant/Non Compliant Systems				
Category	Total # of Systems	Compliant Systems ¹	Non Compliant Systems	Other
Industrial Maintenance	20	10	9	1 ²
Non-flat ³	7	4	3	
Quick Dry Enamel ⁴	3	0	3	

1 - Limits used to determine compliance are 250 g/L VOC for Industrial Maintenance, 150 g/L for Non-flat, and 250 g/L VOC for Quick Dry Enamel.

2 - One industrial maintenance system had a non compliant topcoat, and a compliant primer. This is considered a non compliant system later in the report.

3 – One non-flat coating met the quick dry enamel definition of having a gloss reading of 70 or higher on a 60 degree meter and a dry time of less than two hours to touch, and eight hours to dry hard.

4 – Only one quick dry enamel had a gloss reading of 70 or higher on a 60 degree meter, which is part of the quick dry enamel category definition.

Performance Summary

Non-flats and Quick Dry Enamels (Figures 1-3)

Gloss:

- Non-complying systems performed worse than complying systems.

CIE:

- Non-complying systems performed worse than complying systems.

Yellow:

- Non-complying systems performed worse than complying systems.

Visual Comments:

- A conclusion based on the notes is hard to determine because of the qualitative nature of the written comments, but it appears that the non-complying systems performed equivalently to the complying systems.

Industrial Maintenance Systems (Figures 4-6)

Gloss:

- Non-complying systems performed slightly better than complying systems.

CIE:

- Non-complying systems performed slightly better than complying systems.

Yellow:

- Non-complying systems performed better than complying systems.

Visual Comments:

- A conclusion based on the notes is hard to determine because of the qualitative nature of the written comments, but it appears that the non-complying systems performed slightly better than complying systems.

Overall

In the Non-flat and Quick Dry Enamel coatings systems, complying systems outperformed non-complying systems in gloss testing, CIE, and yellowing, and were equivalent in visual comments.

In the Industrial Maintenance category of coatings systems, complying systems performed worse than non-complying systems in yellowing tests, and slightly worse in gloss, CIE tests, and visual comments.

The exclusion of three industrial maintenance coatings systems that may not have been applied properly or may not have been suitable for outdoor exposure helps the ratings of the complying coatings (see discussion in TAC Ratings section below.) If those three coatings systems are excluded, the performance of complying and non-complying systems is very similar in all tests. See Appendix C for revised Figures 4-6 that reflect exclusion of these coatings.

Figure 1
Gloss Values vs. VOC
Non-Flat Coatings
Emmaqua Tests

◆ Initial
■ Final

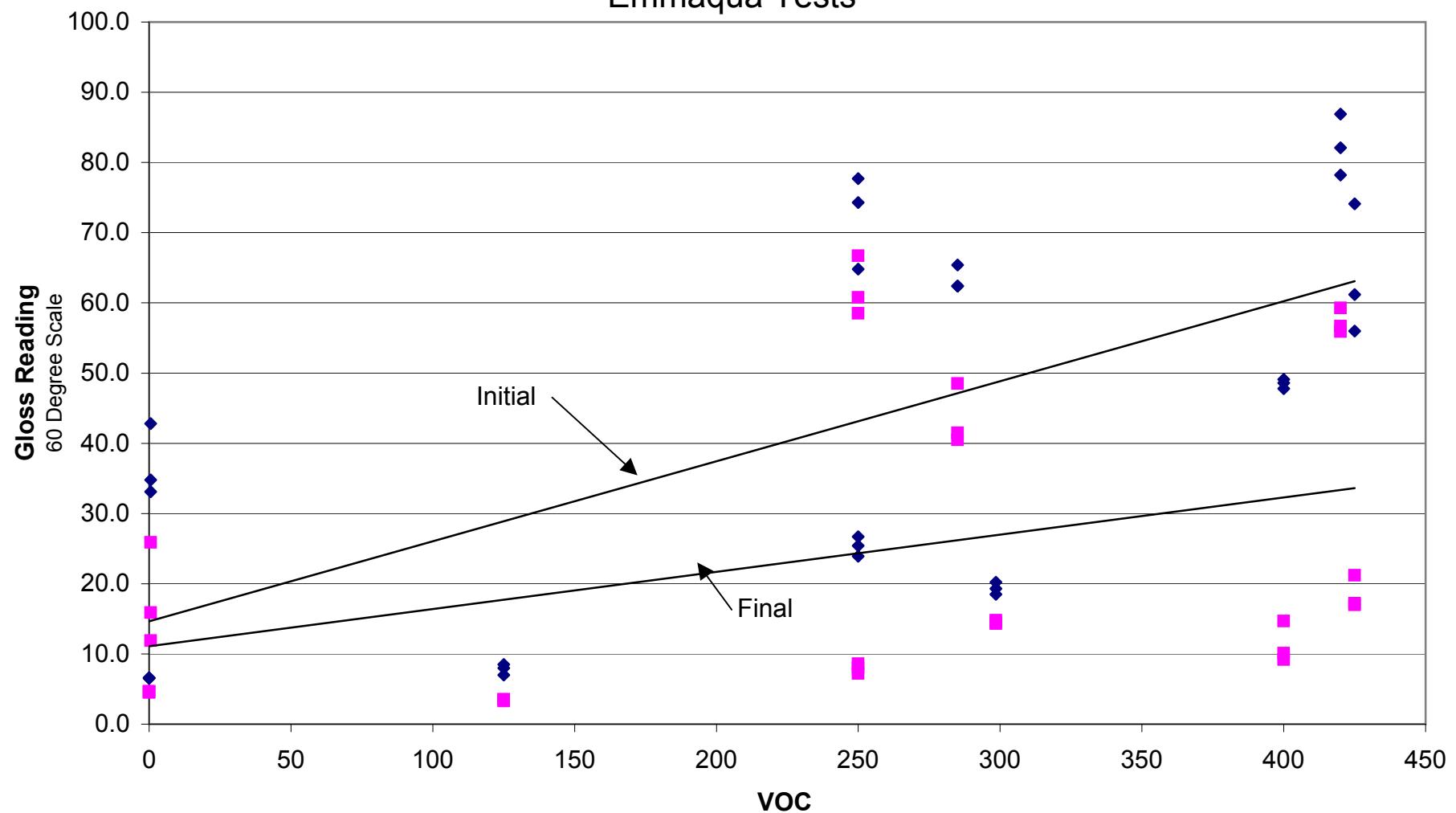


Figure 2
Delta CIE Color vs. VOC
Non-Flat Coatings
Emmaqua Tests

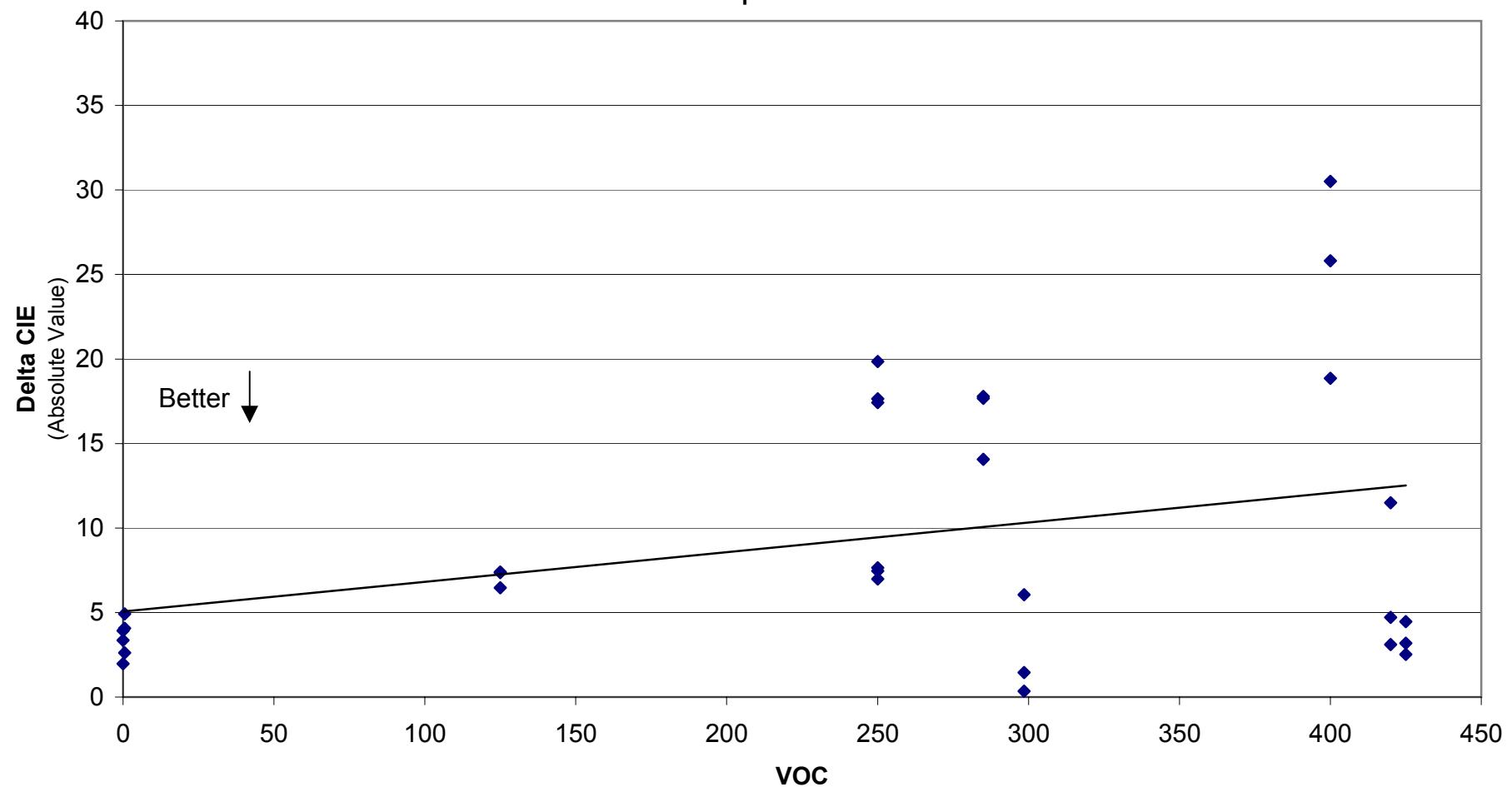


Figure 3
Delta Yellow vs. VOC
Non-Flat Coatings
Emmaqua Tests

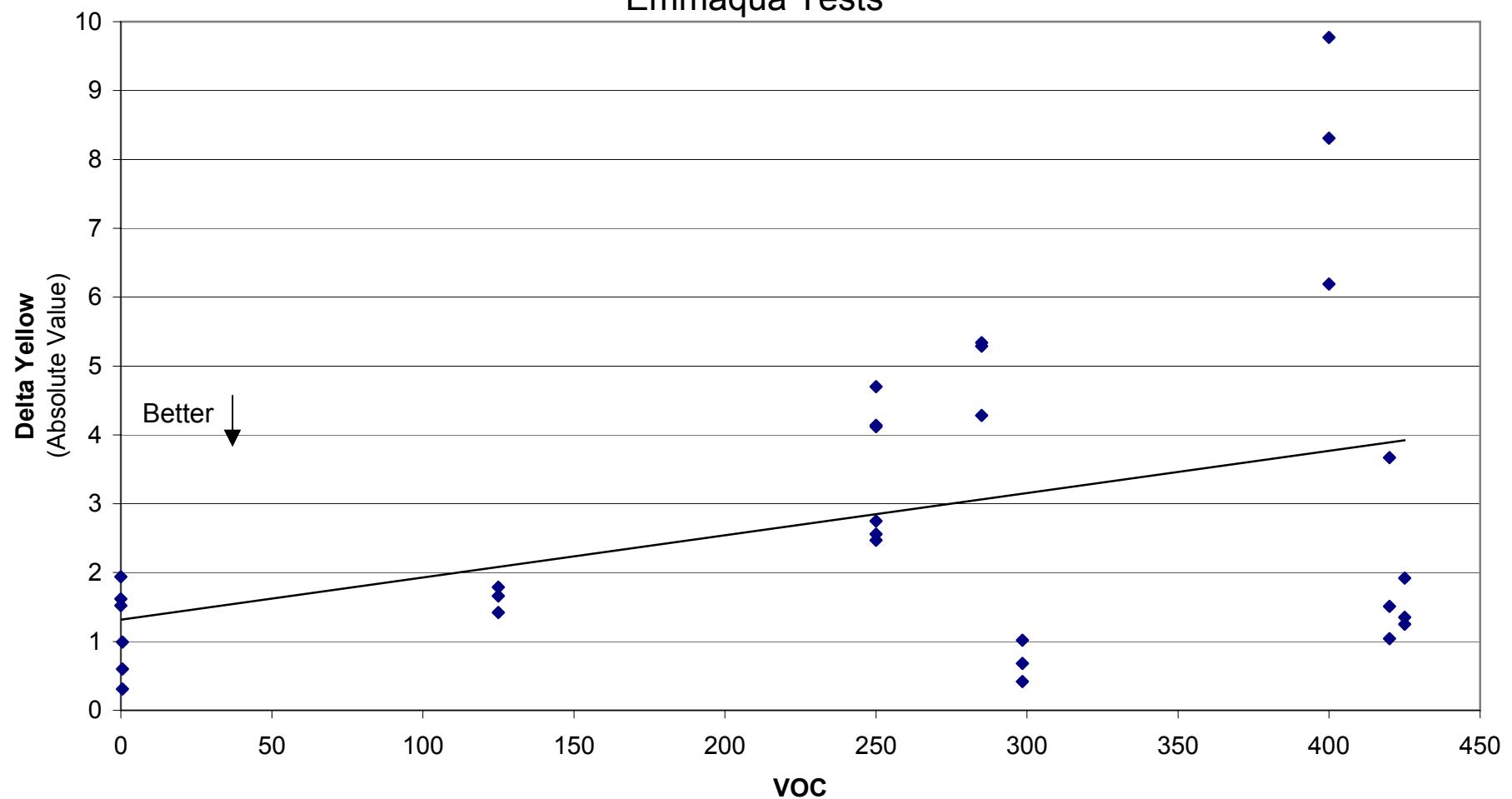


Figure 4
Gloss vs. VOC
Industrial Maintenance
Emmaqua Tests

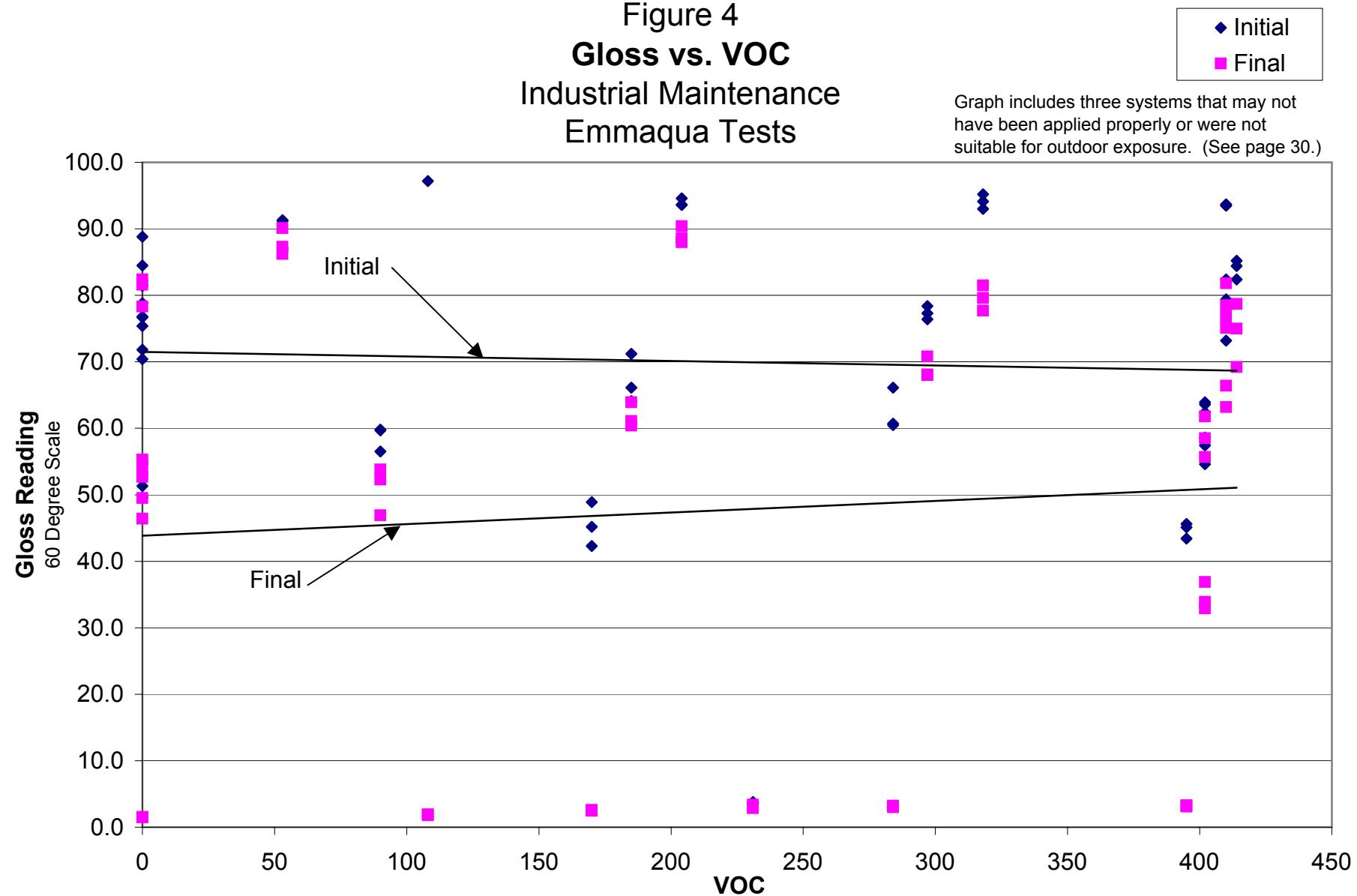


Figure 5
Delta CIE Color vs. VOC
Industrial Maintenance
Emmaqua Tests

Graph includes three systems that may not have been applied properly or were not suitable for outdoor exposure. (See page 30.)

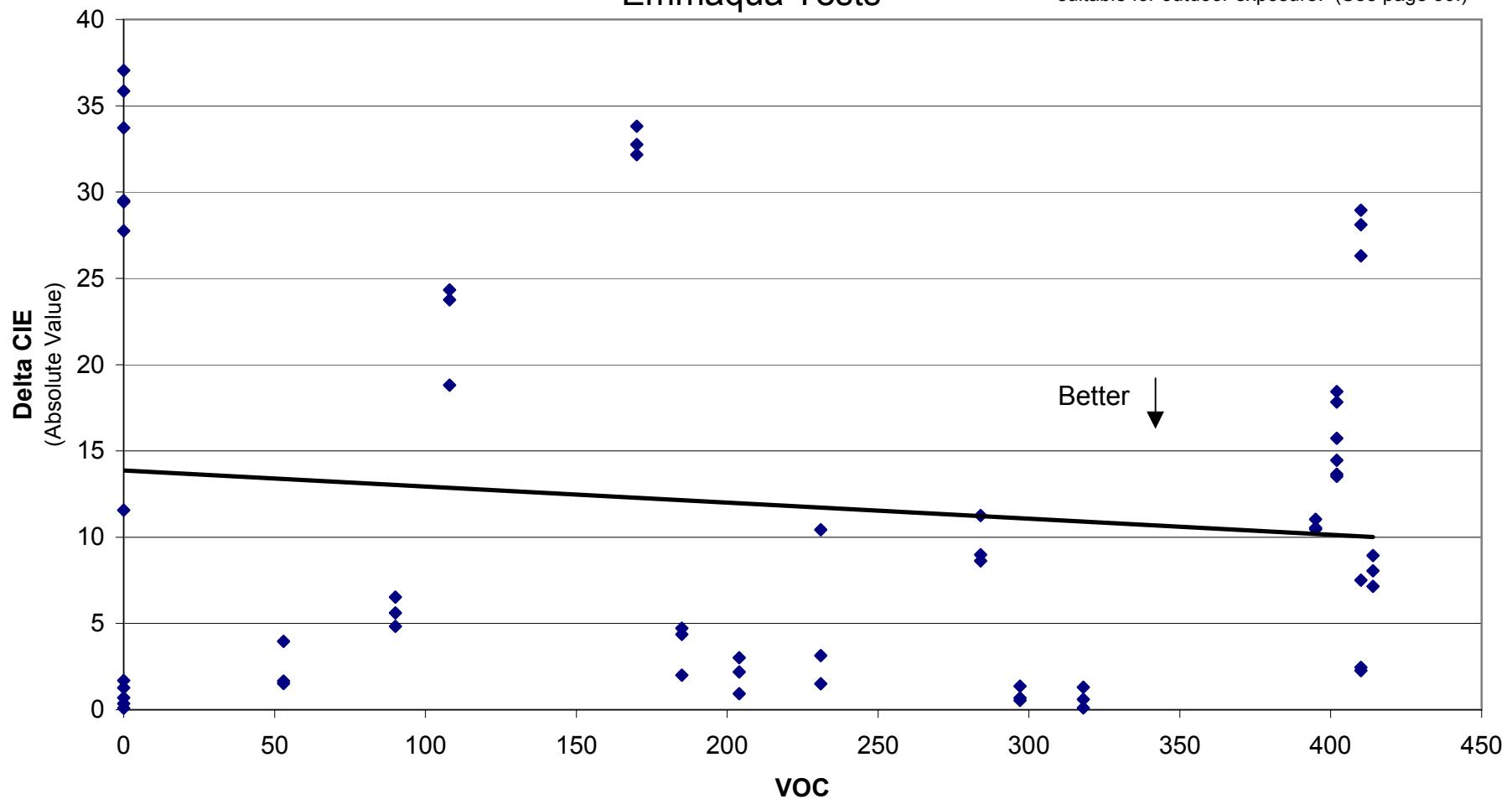
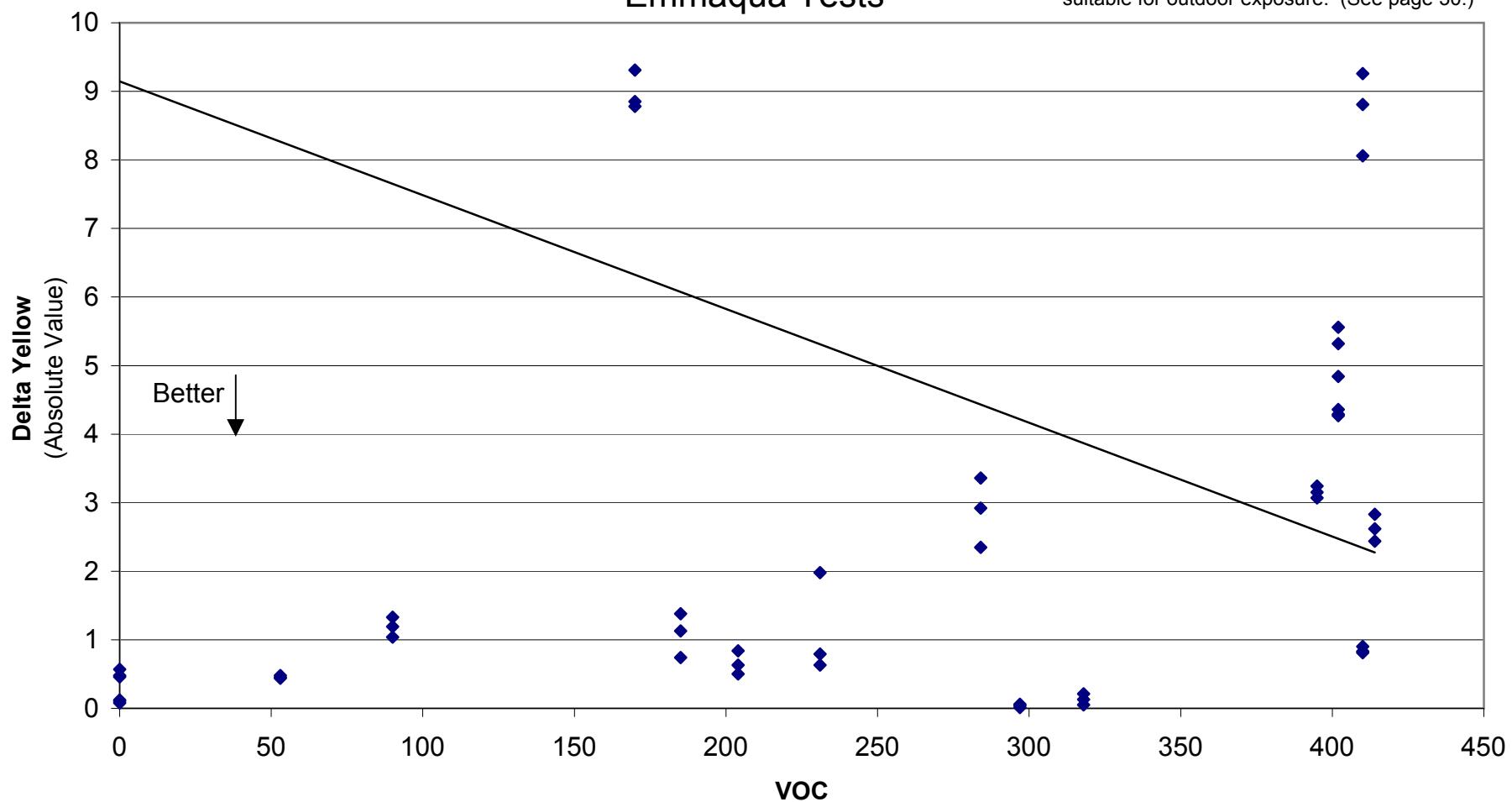


Figure 6
Delta Yellow vs. VOC
Industrial Maintenance
Emmaqua Tests

Graph includes three systems that may not have been applied properly or were not suitable for outdoor exposure. (See page 30.)



24 Month Outdoor Exposure

The outdoor exposure portion of the study consisted of tests performed at regular intervals of the exposure, and observations made by the TAC during inspections. This portion of the study tested 20 industrial maintenance systems, and 11 non-flat systems. The non-flat coatings consisted of 8 non-flat systems and 3 quick dry enamel systems. These were the same coatings tested in the accelerated weathering portion of the study, the only exceptions being a zero VOC non-flat system that was added to replace a coating which did not have enough coating to be tested in the outdoor exposure tests, and the exclusion of a coating that did not have a published VOC value. Panels were tested in duplicate at Saugus and El Segundo in southern California. The Saugus site featured a dry, desert like climate, while the El Segundo site featured more of a coastal climate and an industrial setting, since it was next to Los Angeles International Airport. The TAC made regular visits to these sites, where the condition of the test panels was evaluated. The TAC inspected the panels 3, 6, 9, 12, 18 and 24 months after the start of the exposure. At the 12, 18 and 24 month periods of the study, ratings were given to the panels, and the results are summarized below.

In addition to the evaluations of the panels made by the TAC, NTS performed tests on the panels at the start of the outdoor exposure, and repeated those tests after 6, 12, 18 and 24 months. Tests performed by NTS were gloss on 20, 60 and 85 degree meters, CIE color, and yellowing. Written comments were made on chalking, cracks, flakes and blisters. This portion of the study began in April 2000 and was completed in April 2002.

During discussion of the study by the TAC, some criticisms of the testing procedures were made. The coatings were applied using a draw down technique in accordance with ASTM test methods, rather than by the manufacturers' recommendations. Although the draw down technique was specified in the testing protocol that was approved by the TAC, some members felt that ignoring the manufacturers' recommended application method affected the performance of the panels. Upon inspection of the panels, the scribes observed on the industrial maintenance panels seemed to be inconsistent. Some had multiple scribes, or scribes of varying depth and width. The rack the panels were tested on consisted of multiple rows, some of which were closer to the ground than others. Some TAC members felt that the panels on the lower rows could have been subjected to more moisture or different rates of temperature change, since they were closer to the ground than others. After the coatings were applied to the test panels, the panels were kept in storage for several months before the outdoor exposure began. According to some members of the TAC, this went against manufacturer recommendations and could have affected the performance of the coatings. During a conference call, a TAC member said that gloss measurements for the purpose of determining whether it would meet the definition of a high gloss coating are usually done on paper per ASTM D523-89. The gloss readings from the NTS study were taken with the steel panels as a

substrate. This might explain why some of the gloss measurements were not in line with expectations.

Coatings Used in the Outdoor Exposure Study

Non-Flat and Quick Dry Enamel Systems

	System Reference #	Resin Type	Primer VOC	Topcoat VOC
QDNFS-01	111-218	Alkyd/Alkyd	400	170
NFS-05	322-206	Acrylic	115	135
NFS-09	325-210	Acrylic	0	0
NFS-18	332-217	Acrylic	250	250
QDS-04	111-111-112	Alkyd/Alkyd	400/400	400
QDS-01	101-102	Alkyd/Alkyd	440	400
NFS-12	328-213	Alkyd/Acrylic	350	247
NFS-21	334-203	Acrylic	0	0
NFS-15	331-237	Acrylic	250	250
NFS-01	301-201	Copolymer Latex/Acrylic Latex	1	0
QDS-03	109-110	Alkyd	450	400

Industrial Maintenance Systems

	System Reference #	Resin Type	Primer VOC	Topcoat VOC
IMCS-17	930-931	Alkyd/Alkyd	419	385
IMCS-14	923-924	Alkyd/Alkyd	382	422
IMCS-15	925-925	Epoxy	395	395
IMCS-18	932-932	Epoxy	284	284
IMCS-13	922-922	Acrylic	231	231
IMCS-04	906-907-907	Acrylic/Acrylic	138	208/208
IMCS-05	908-909	Acrylic/Acrylic	60	120
IMCS-08	914-915-915	Butadiene-Epoxy/Urethane	0	0/0
IMCS-02	902-903	Epoxy Ester/Silicone	400	420
IMCS-06	910-911	Epoxy/Urethane	0	0
IMCS-11	919-919	Epoxy	170	170
IMCS-01	901-901	Siloxirane	108	108
IMCS-16	927-928-929	Epoxy/Epoxy/Urethane	320/275	295
IMCS-10	917-918	Alkyd/Urethane Alkyd	417	411
IMCS-07	912-913-913	Novolac	0	0/0
IMCS-19	933-932-934	Zinc/Epoxy/Urethane	282/284	388
IMCS-08	914-916-916	Butadiene-Epoxy/Epoxy	0	0/0
IMCS-12	920-921	Epoxy/Siloxane	288	120
IMCS-03	904-905-905	Zinc/Urethane	49	55/55
IMCS-20	902-010	Epoxy Ester/Urethane	400	420

Outdoor Exposure - Non-Flat Coatings		
Manufacturer	Number of Coatings in Study	Number of Times a Coating was Used
Benjamin Moore	2	2
Dunn Edwards	4	4
Frazee Industries	2	2
Gal XE-2010	3	3
ICI/Glidden	2	2
Morewear	3	3
PPA Technologies	1	1
Vista Paints	1	1
EMU	1	1
Masterchem	1	3
Zehrung	1	1
Total	21	23

Different Coatings Used:
 10 Primers - All Single Component
 11 Topcoats - All Single Component

Outdoor Exposure – Industrial Maintenance Coatings		
Manufacturer	Number of Coatings in Study	Number of Times a Coating was Used
Advanced Polymer Sciences	1	2
Ameron Protective Coatings	2	2
Benjamin Moore	2	2
Coatings Resources Corp.	2	2
Dunn Edwards	3	4
Hart Polymers	3	6
ICI/Devoe	6	9
Sherwin Williams	4	6
Sigma Coatings	2	2
Superior Environmental Products	2	3
Tnemec	7	9
Total	34	47

Different Coatings Used:
 Primers – 9 single component, 9 multi component
 Midcoat – 2 multicomponent
 Topcoat – 10 single component, 10 multicomponent

Outdoor Exposure – Compliant/Non Compliant Systems				
Category	Total # of Systems	Compliant Systems ¹	Non Compliant Systems ¹	Other
Industrial Maintenance	20	10	9	1 ²
Non-flat ³	8	4	4	
Quick-Dry Enamel ⁴	3	0	3	

1 - Limits used to determine compliance are 250 g/L VOC for Industrial Maintenance, 150 g/L for Non-flat, and 250 g/L VOC for Quick Dry Enamel.

2 - One industrial maintenance system had a non compliant topcoat, and a compliant primer. This is considered a non compliant system later in the report.

3 – One non-flat coating met the quick dry enamel definition of having a gloss reading of 70 or higher on a 60 degree meter and a dry time of less than two hours to touch, and eight hours to dry hard.

4 – Only one quick dry enamel had a gloss reading of 70 or higher on a 60 degree meter, which is part of the quick dry enamel category definition.

Performance Summary

Saugus

Non-flat and Quick Dry Enamel Systems (Figures 7-9)

Gloss:

- Non-complying systems performed worse than complying systems.

CIE:

- Non-complying systems performed equivalently to complying systems.

Yellowing:

- Non-complying systems performed worse than complying systems.

Industrial Maintenance Systems (Figures 10-12)

Gloss:

- Non-complying systems performed slightly worse than complying systems.

CIE:

- Non-complying systems performed better than complying systems.

Yellowing:

- Non-complying systems performed better than complying systems.

El Segundo

Non-flat and Quick Dry Enamel Systems (Figures 13-15)

Gloss:

- Non-complying systems performed worse than complying systems.

CIE:

- Non-complying systems performed better than complying systems in the CIE readings.

Yellowing:

- Non-complying systems performed equivalently to complying systems.

Industrial Maintenance Systems (Figures 16-18)

Gloss:

- Non-complying systems performed equivalently to complying systems.

CIE:

- Non-complying systems performed better than complying systems in the CIE readings.

Yellowing:

- Non-complying systems performed better than complying systems.

Overall

In the Non-Flat Coatings category, complying systems performed similarly to non-complying systems. Complying systems showed better performance in gloss tests. At the Saugus test site, complying systems performed better in yellowing tests and equivalently in CIE tests, and at the El Segundo test site, non-complying systems performed equivalently in yellowing tests, and better in CIE tests.

In the Industrial Maintenance category of coatings, non-complying systems generally had equivalent performance in the gloss tests, and better performance in CIE and yellowing tests. If three coatings systems that might not have been appropriate for outdoor exposure or the substrate type are excluded, the performances of complying and non-complying systems are overall similar (See discussion in TAC Ratings section below). See Appendix C for revised figures 10-12 and 16-18 that reflect exclusion of these coatings. NTS also made written comments on the test panels, but most comments were very similar and making a judgement on the relative performance of the coatings based on those notes would be difficult.

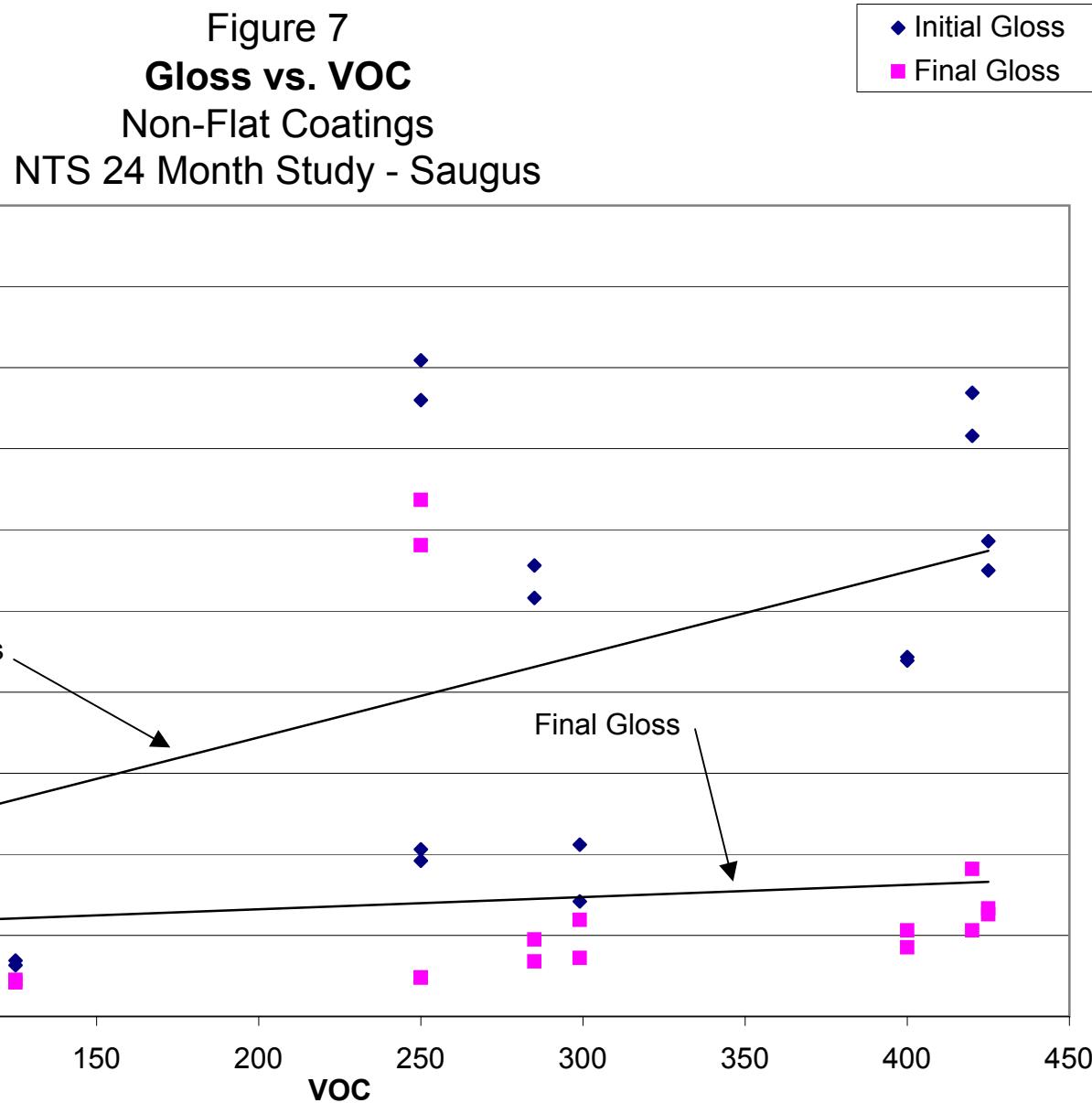


Figure 8
Delta CIE Color vs. VOC
Non-Flat Coatings
NTS 24 Month Study - Saugus

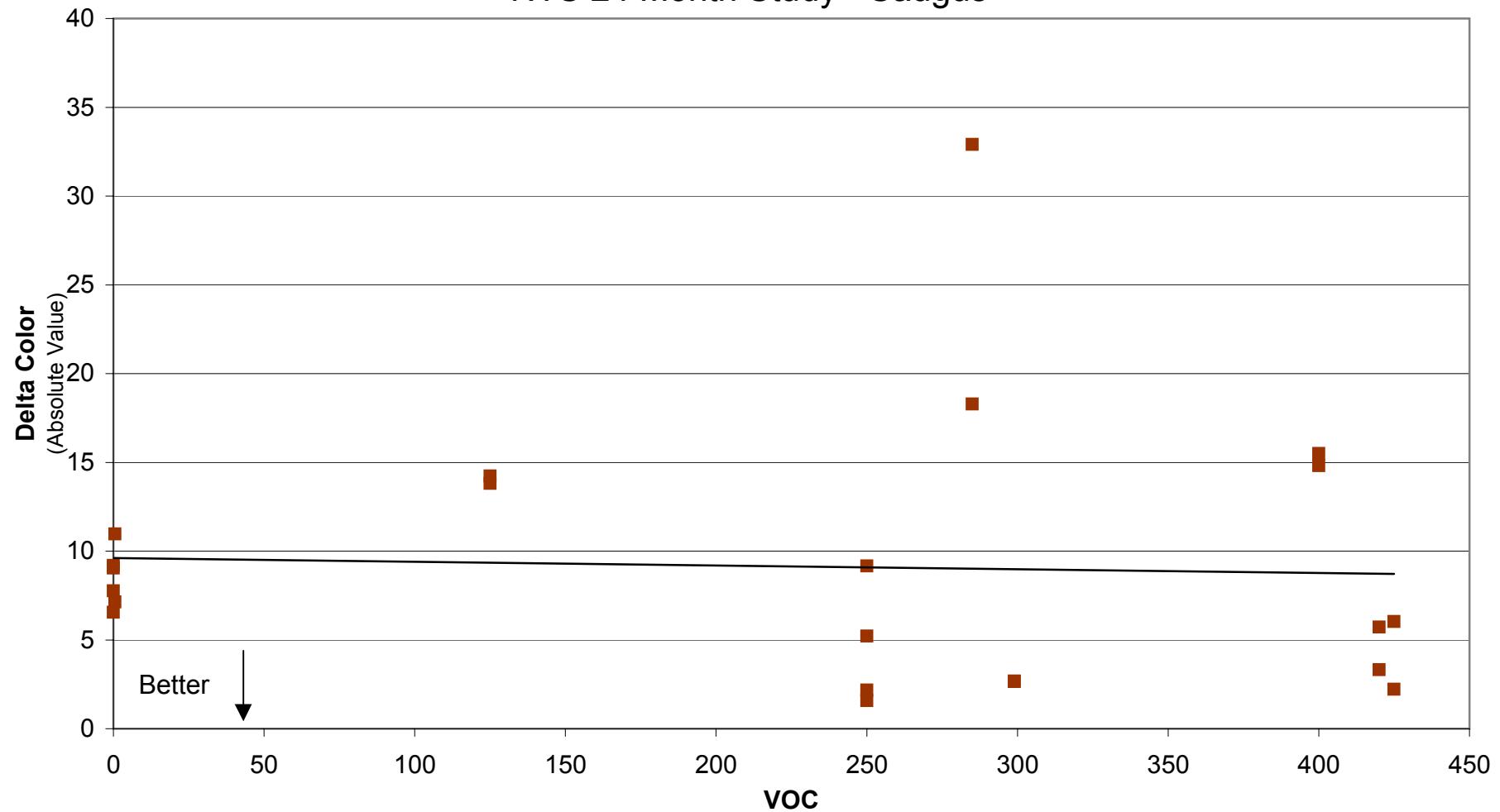


Figure 9
Delta Yellow vs. VOC
Non Flat Coatings
NTS 24 Month Study - Saugus

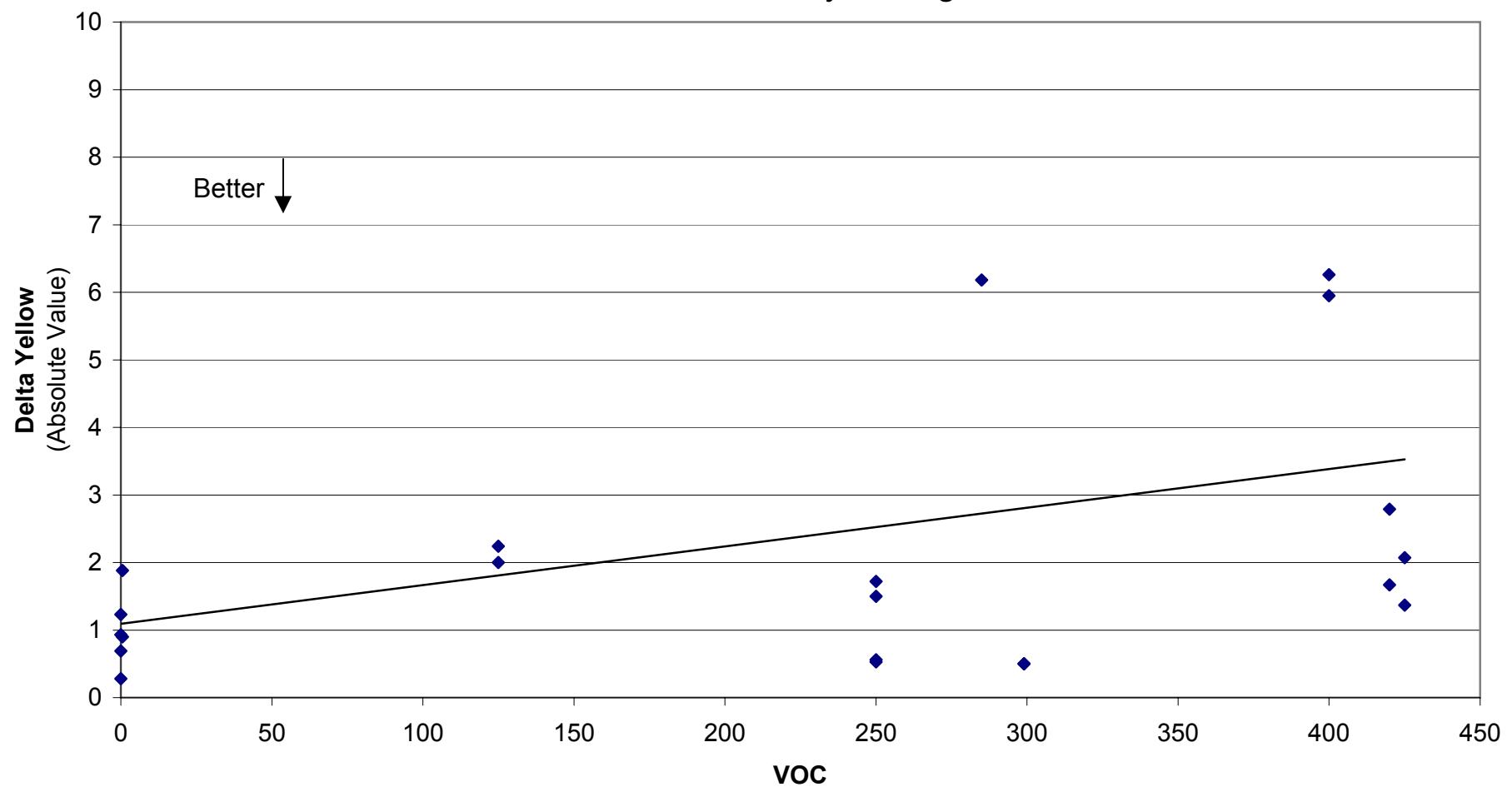


Figure 10
Gloss vs. VOC
 Industrial Maintenance
 NTS 24 Month Study - Saugus

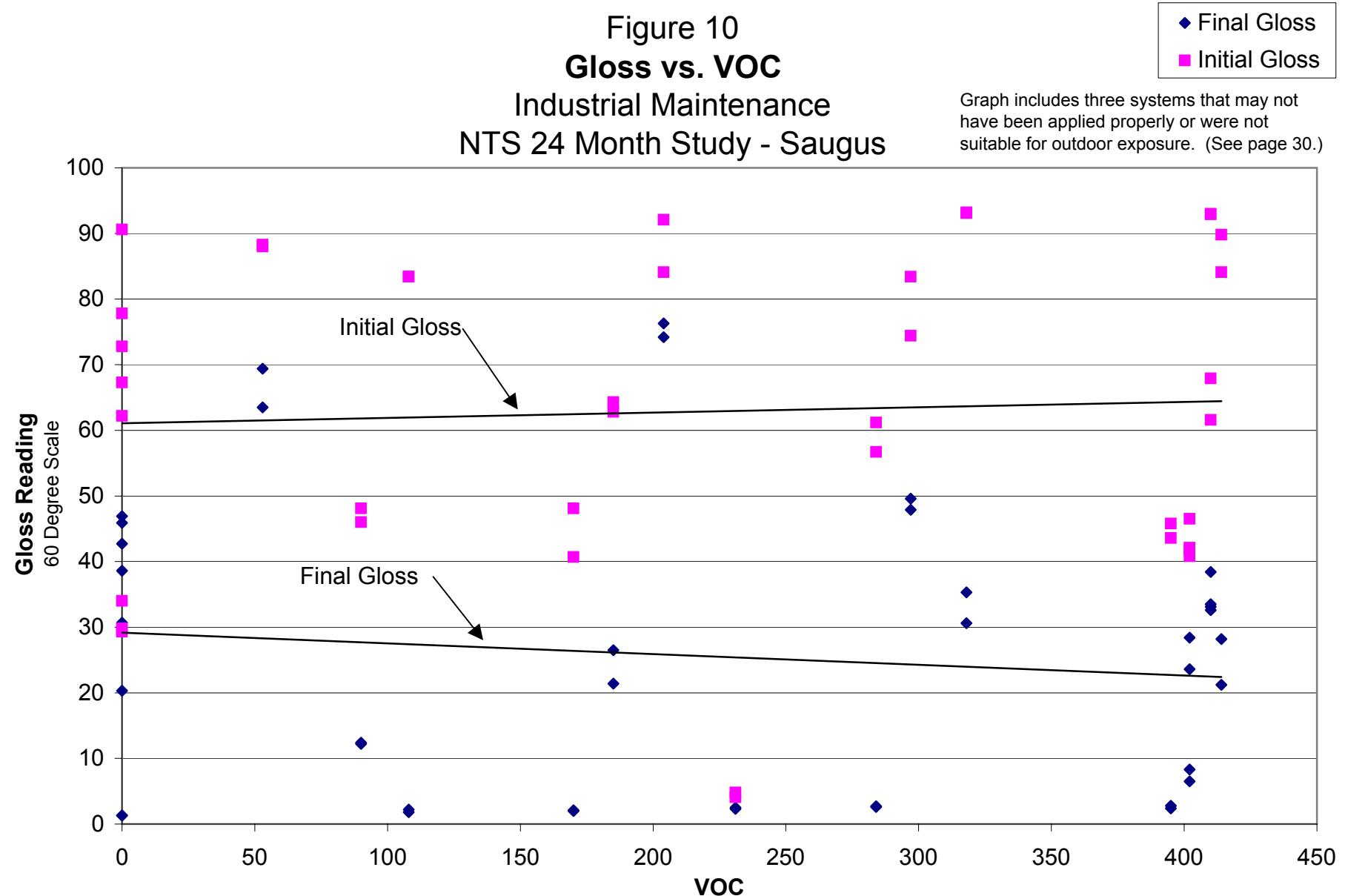


Figure 11
Delta CIE Color vs. VOC
Industrial Maintenance
NTS 24 Month Study - Saugus

Graph includes three systems that may not have been applied properly or were not suitable for outdoor exposure. (See page 30.)

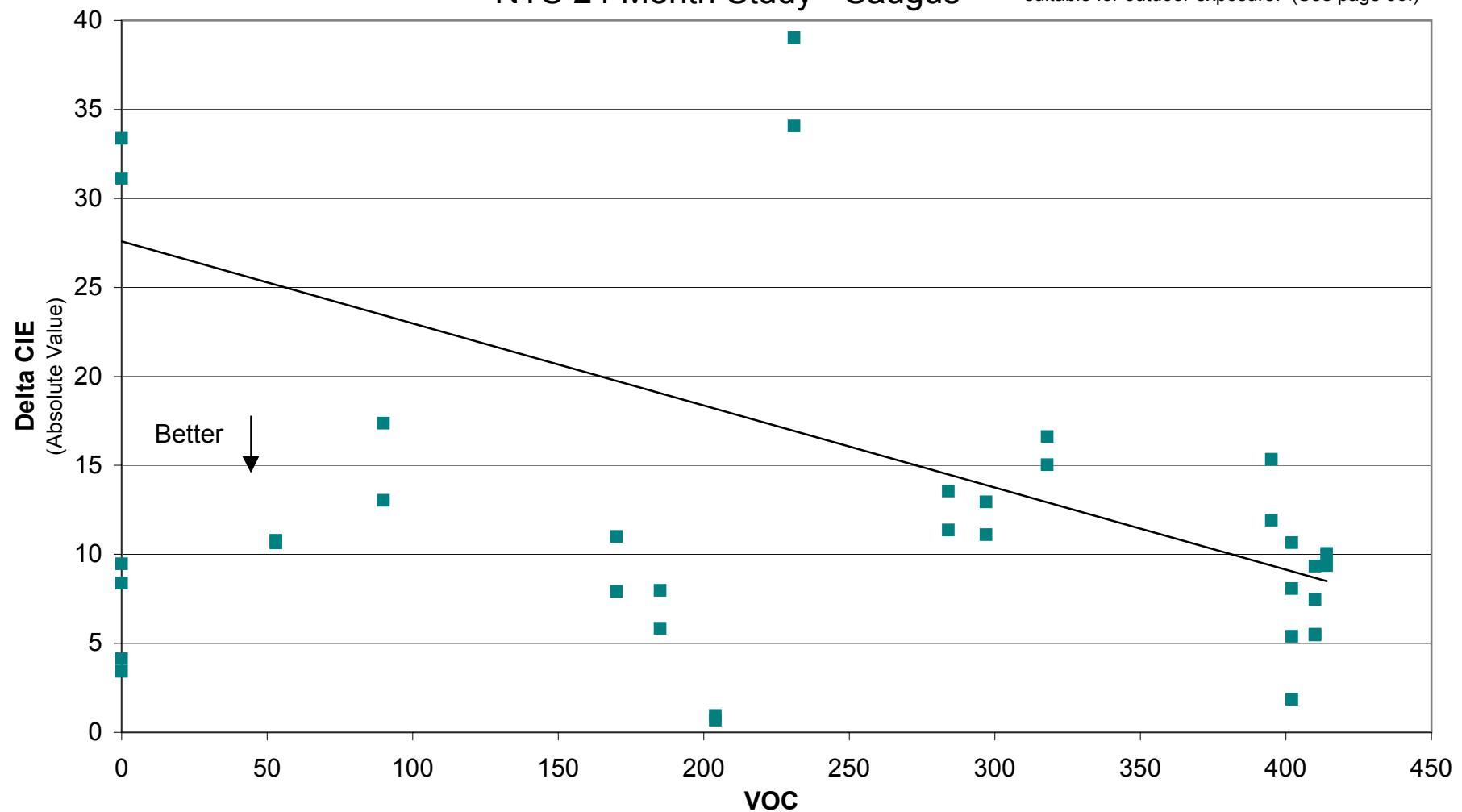


Figure 12
Delta Yellow vs. VOC
Industrial Maintenance
NTS 24 Month Study - Saugus

Graph includes three systems that may not have been applied properly or were not suitable for outdoor exposure. (See page 30.)

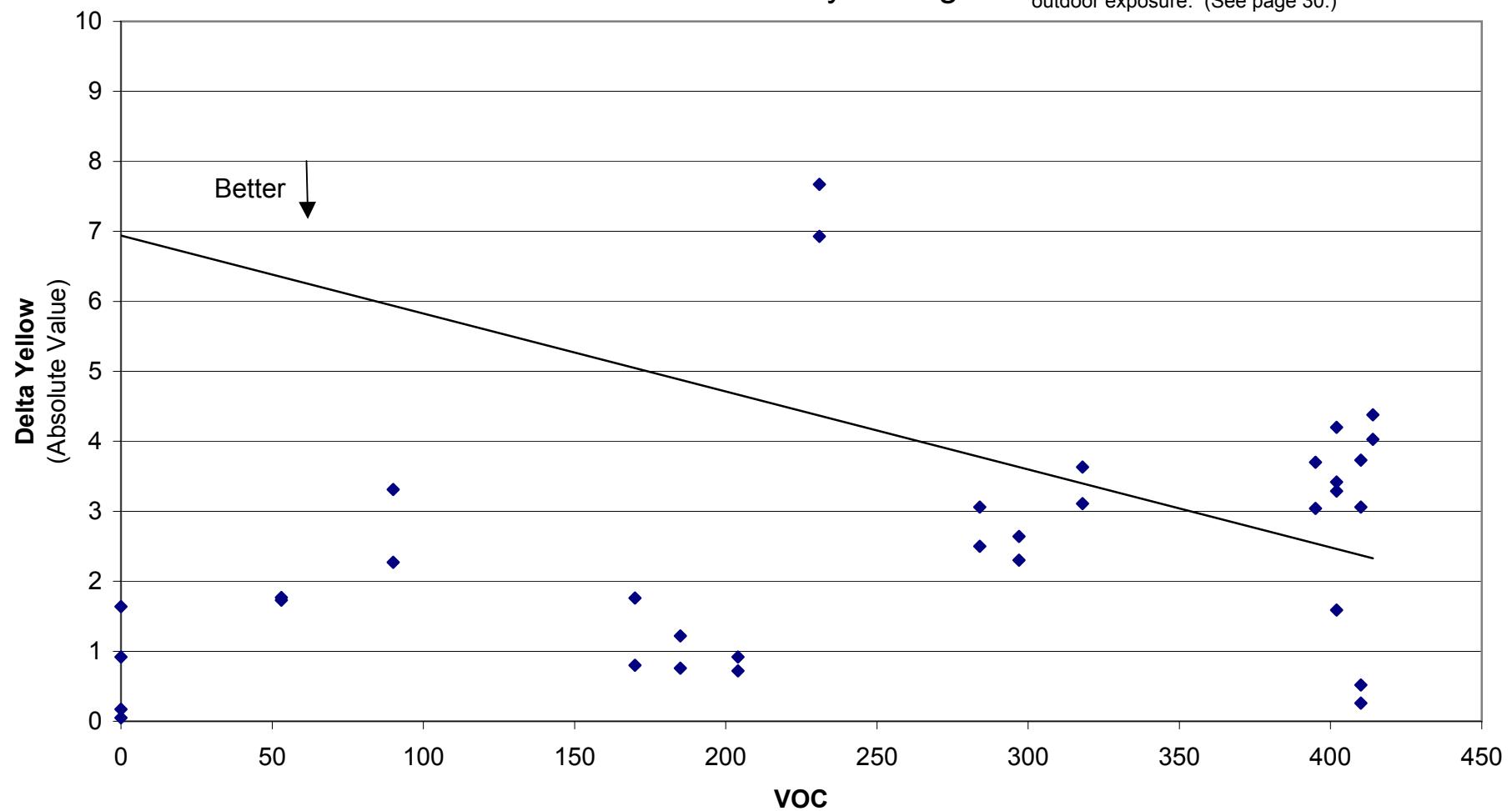


Figure 13
Gloss vs. VOC
Non Flat Coatings
NTS 24 Month Study - El Segundo

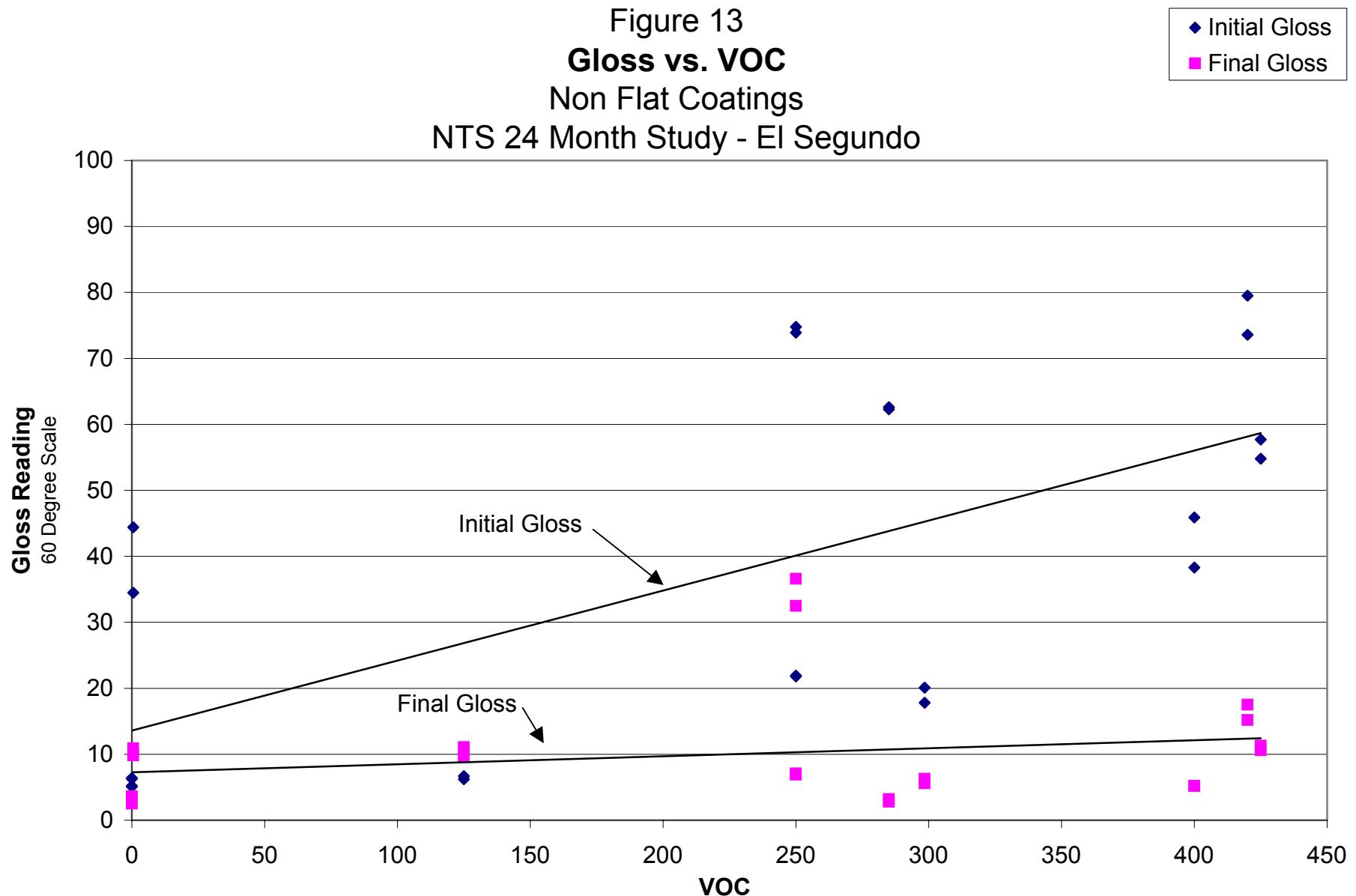


Figure 14
Delta CIE Color vs. VOC
Non Flat Coatings
NTS 24 Month Study - El Segundo

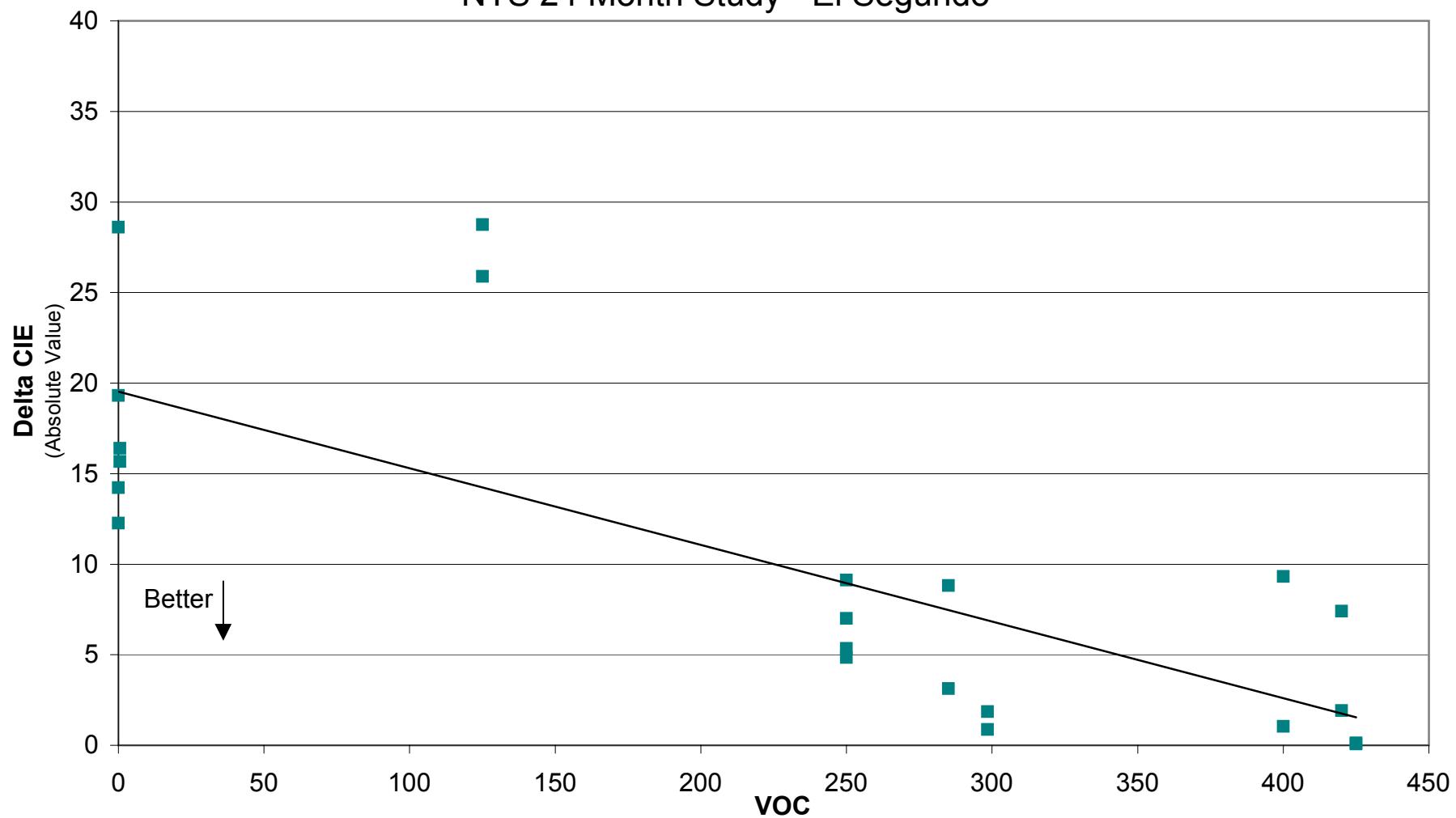


Figure 15
Delta Yellow vs. VOC
Non-Flat Coatings
NTS 24 Month Study - El Segundo

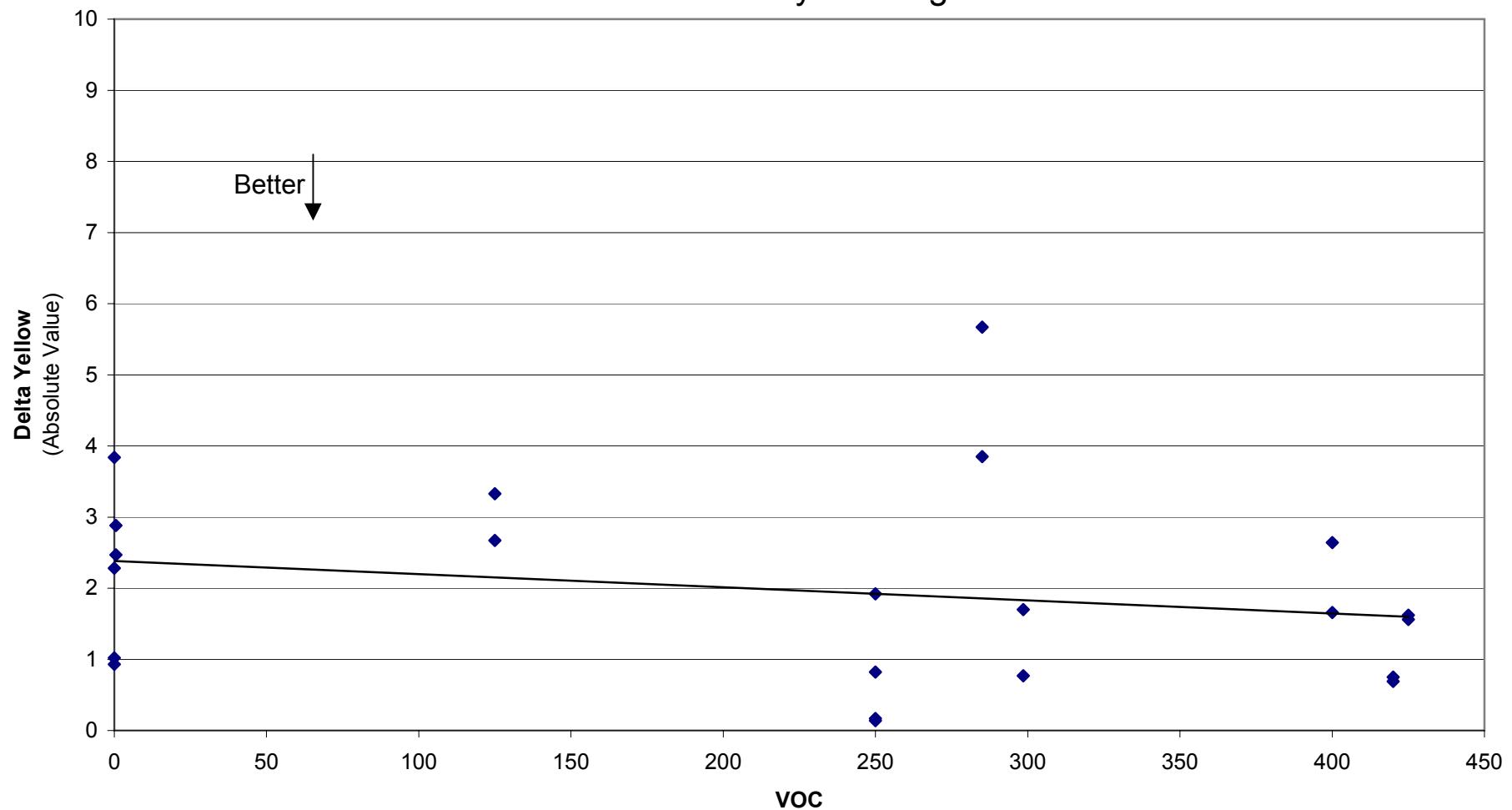


Figure 16
Gloss vs. VOC
Industrial Maintenance
NTS 24 Month Study - El Segundo

◆ Initial Gloss
■ Final Gloss

Graph includes three systems that may not have been applied properly or were not suitable for outdoor exposure. (See page 30.)

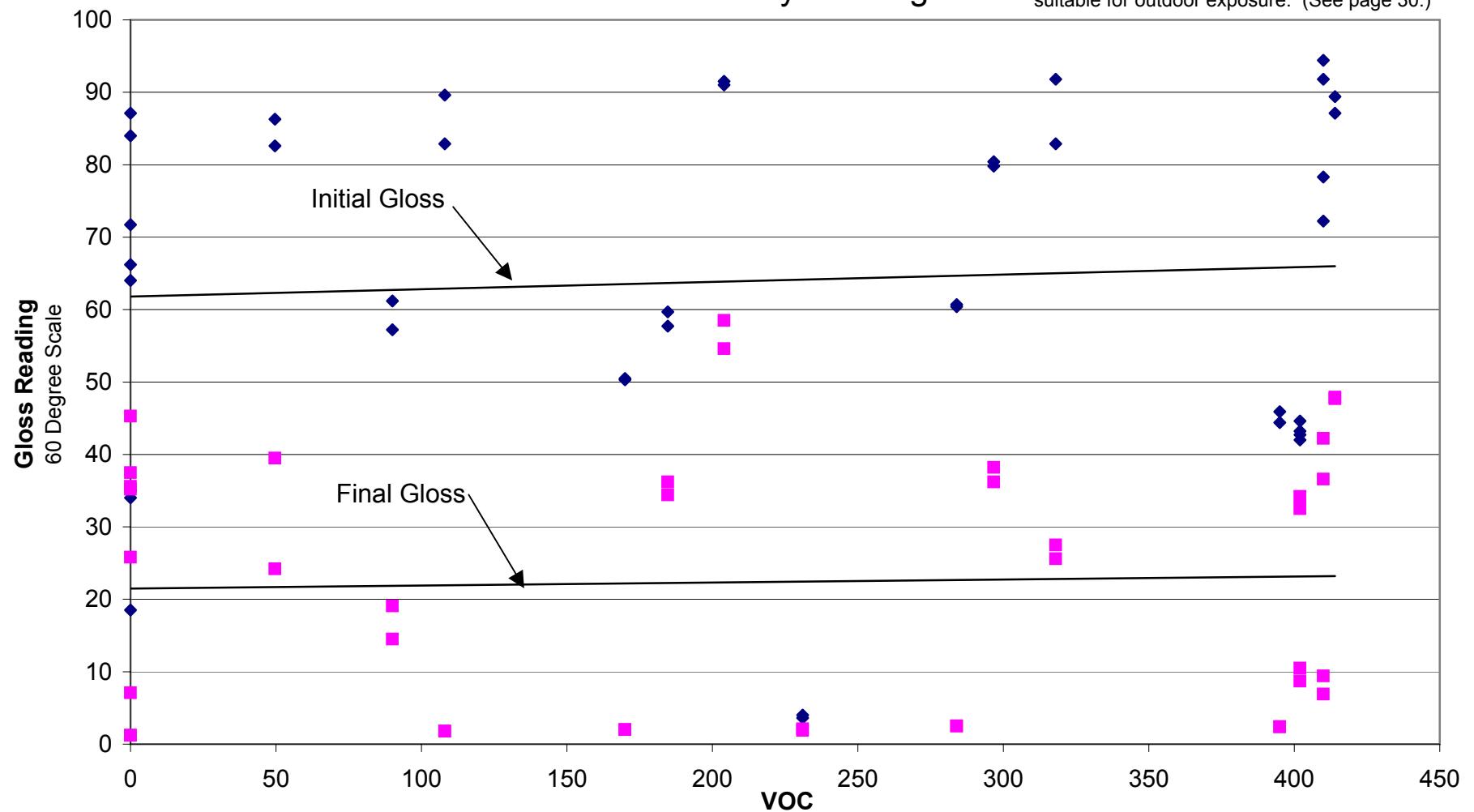


Figure 17
Delta CIE Color vs. VOC
Industrial Maintenance
NTS 24 Month Study - El Segundo

Graph includes three systems that may not have been applied properly or were not suitable for outdoor exposure. (See page 30.)

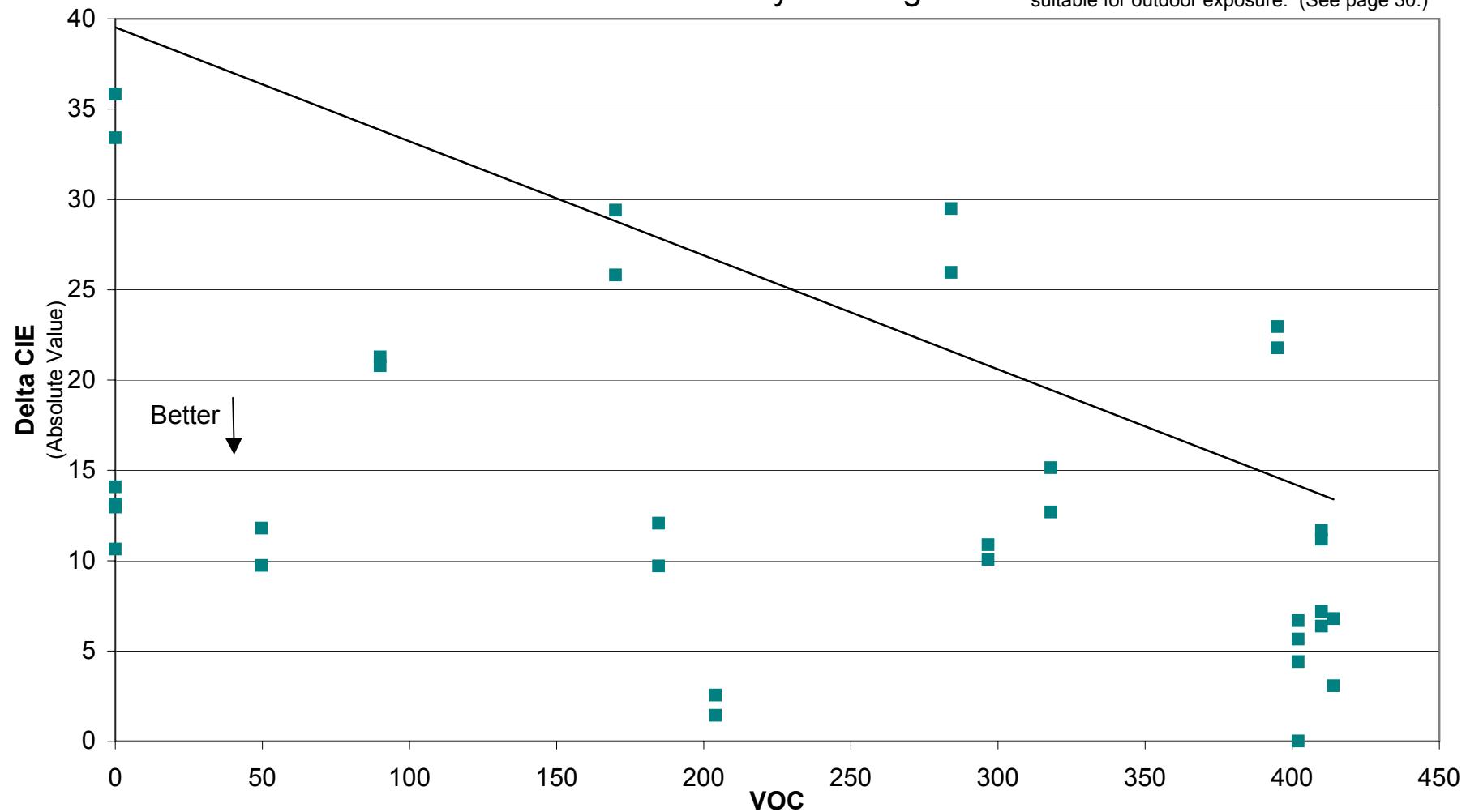
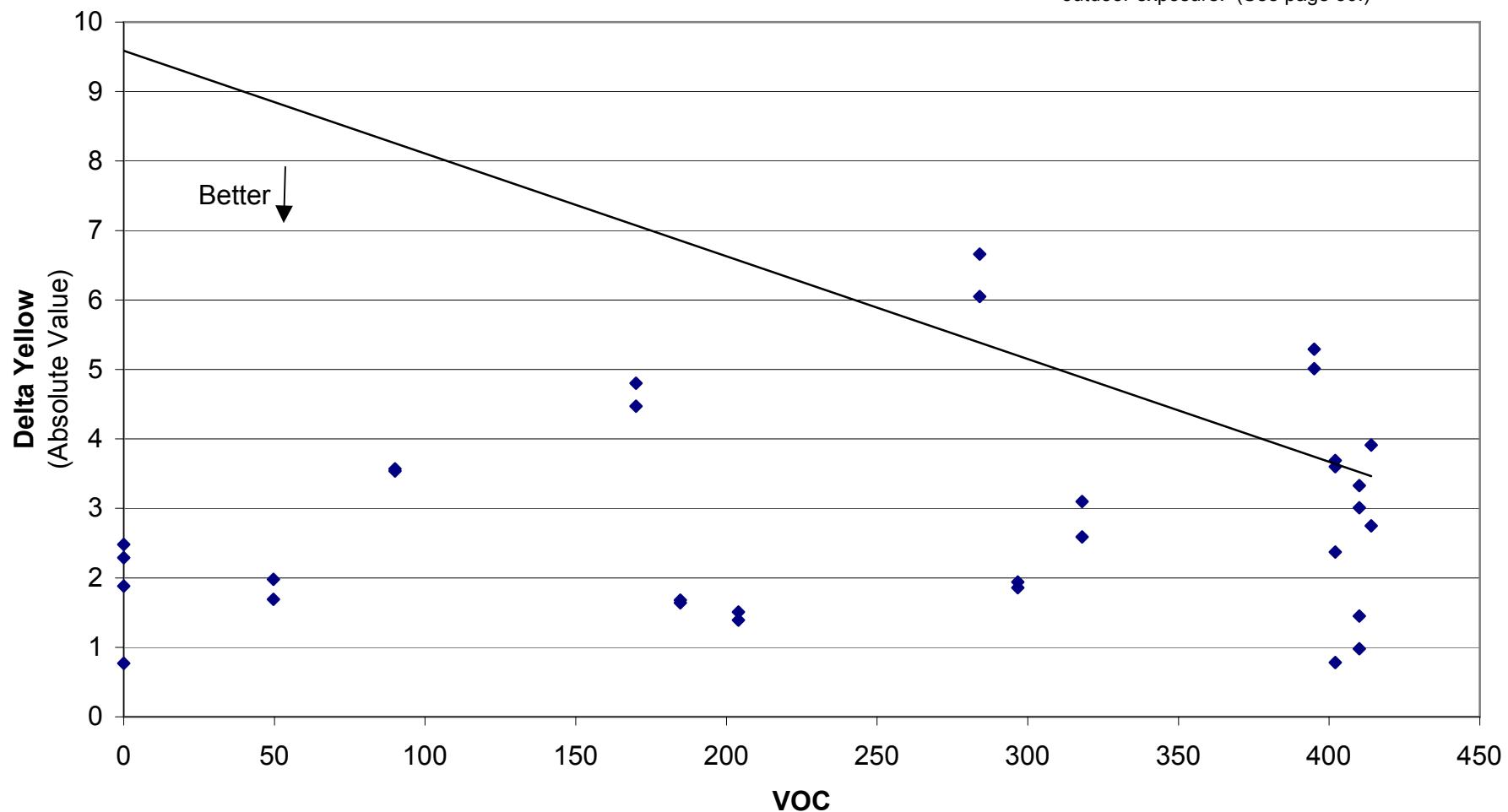


Figure 18
Delta Yellow vs. VOC
Industrial Maintenance
NTS 24 Month Study - El Segundo

Graph includes three systems that may not have been applied properly or were not suitable for outdoor exposure. (See page 30.)



TAC Ratings

In addition to the tests performed by NTS, the TAC rated the panels based on visual observation during the 12, 18 and 24 month site visits to the Saugus and El Segundo facilities. During this time, each test panel was given a rating from 1 to 5, with 1 being best. In the tables below, the industrial maintenance system with a complying topcoat and non-complying primer was considered to be a non-complying system.

At the 12 month and 24 month evaluations, pictures were taken of the panels by ARB staff with a digital camera. Links to the pictures can be found in Tables B-4 and B-5 in Appendix B in the electronic version of this report.

Saugus Test Site

Coating Type	VOC Category	Average Rating		
		12 Month	18 Month	24 Month
IM	Complying	3.6	3.0	3.8
IM	Non-complying	2.4	2.2	2.6
Non Flat / QDE	Complying	NA*	2.6	3.0
Non Flat / QDE	Non-complying	NA*	3.6	3.6

* Most non-flat panels were not given a rating during the 12 month evaluation.

El Segundo Test Site

Coating Type	VOC Category	Average Rating		
		12 Month	18 Month	24 Month
IM	Complying	3.6	3.1	2.9
IM	Non-complying	2.4	2.8	2.7
Non Flat / QDE	Complying	NA*	2.3	3.0
Non Flat / QDE	Non-complying	NA*	3.3	3.7

* Most non-flat panels were not given a rating during the 12 month evaluation.

Combined Test Sites

Coating Type	VOC Category	Average Rating		
		12 Month	18 Month	24 Month
IM	Complying	3.6	3.1	3.4
IM	Non-complying	2.4	2.5	2.7
Non Flat / QDE	Complying	NA*	2.5	3.0
Non Flat / QDE	Non-complying	NA*	3.5	3.7

* Most non-flat panels were not given a rating during the 12 month evaluation.

Ratings Summary

According to the rankings given to the panels by the TAC, the non-complying IM systems performed better than the complying IM systems at the Saugus site consistently throughout the test period. At the El Segundo site, the complying IM systems performed better than the non-complying IM coatings at the 12 month mark, and equivalently at the 18 and 24 month marks. At both the Saugus and El Segundo sites, the complying non-flat systems performed better than the non-complying non-flat systems at the 18 and 24 month marks. The rankings given to the non-flat panels during the 12 month inspection were incomplete, and were excluded from this summary.

During the course of the 18-month review, the TAC observed that two of the industrial maintenance coatings systems (901-901 and 912-913-913) appeared to be unsuitable for outdoor exposure, based on their resin system and discoloration during the test. These coatings were thought to be more appropriate for a tank lining application. At the time, the TAC decided to exclude those particular panels from the rankings. A third industrial maintenance coating (922-922) appears to have been applied improperly. A review of the product data sheet warns of flash rusting when the coating is not used with a primer. That particular coating system featured two coatings of the same product, and did not include a primer. The results when these three systems are excluded are summarized below.

Saugus Test Site

Coating Type	VOC Category	Average Rating		
		12 Month	18 Month	24 Month
IM	Complying	3.0	2.7	3.3
IM	Non-complying	2.4	2.2	2.6

El Segundo Test Site

Coating Type	VOC Category	Average Rating		
		12 Month	18 Month	24 Month
IM	Complying	3.0	2.8	2.4
IM	Non-complying	2.4	2.8	2.7

Combined Test Sites

Coating Type	VOC Category	Average Rating		
		12 Month	18 Month	24 Month
IM	Complying	3.0	2.8	2.9
IM	Non-complying	2.4	2.5	2.7

Ratings Summary Excluding Three IM Coating Systems

Excluding the three systems mentioned above, the average rating of complying systems generally improved. At the Saugus site, non-complying systems performed better than complying coatings at the 12, 18 and 24 month marks, but to a lesser extent than before. At the El Segundo site, non-complying systems performed better than complying systems at the 12 month mark, and equivalently at the 18 month mark. At the 24 month mark, complying systems performed better than non-complying systems. The ratings of the non-flat systems did not change since the three systems mentioned above are IM systems.

Appendix A

Individual Coatings and Systems

Master Coating List

Table A-1
Accelerated Weathering - Non-Flat Coatings
Primer

System Reference Number	Number of Times Coating was Used	Number of Components	VOC	Notes
328	1	1	247	
101	1	1	440	
322	1	1	115	
331	1	1	250	
301	1	1	1	
325	1	1	0	
332	1	1	250	
315	0	1	Unknown	Coating was not included in the final evaluation.
111	3	1	400	
109	1	1	450	
310	0	1	NA	Insufficient amount of coating to test.

Table A-2
Accelerated Weathering - Non-Flat Coatings
Topcoat

System Reference Number	Number of Times Coating was Used	Number of Components	VOC	Notes
213	1	1	247	
102	1	1	400	
206	1	1	135	
237	1	1	250	
201	1	1	0	
210	1	1	0	
217	1	1	250	
216	0	1	Unknown	Coating was not included in the final summary
110	1	1	400	
215	0	2	NA	Insufficient amount of coating to test.
218	1	1	170	
112	1	1	400	

Table A-3
Accelerated Weathering - Industrial Maintenance
Primer

System Reference Number	Number of Times Coating was Used	Number of Components	VOC
901	1	2	108
920	1	2	288
917	1	1	417
910	1	2	0
902	2	1	400
914	2	1	0
919	1	2	170
930	1	1	419
932	1	2	284
933	1	2	282
904	1	1	49
906	1	1	138
908	1	1	60
912	1	2	0
922	1	1	231
923	1	1	382
925	1	2	395
927	1	2	320

Table A-4
Accelerated Weathering - Industrial Maintenance
Topcoat

System Reference Number	Number of Times Coating was Used	Number of Components	VOC
901	1	2	108
921	1	2	120
918	1	1	411
911	1	2	0
903	1	1	420
10	1	1	420
915	2	1	0
916	2	1	0
919	1	2	170
931	1	1	385
932	1	2	284
905	2	2	55
907	2	1	208
909	1	1	120
913	2	2	0
922	1	1	231
924	1	1	422
925	1	2	395
929	1	2	295
934	1	2	388

Table A-5
Accelerated Weathering - Industrial Maintenance
Midcoat

System Reference Number	Number of Times Coating was Used	Number of Components	VOC
928	1	2	275
932	1	2	284

Table A-6
Outdoor Exposure - Non-Flat Coatings
Primer

System Reference Number	Number of Times a Coating was Used	Number of Components	VOC
328	1	1	247
101	1	1	440
322	1	1	115
331	1	1	250
301	1	1	1
334	1	1	0
325	1	1	0
332	1	1	250
111	3	1	400
109	1	1	450

Table A-7
Outdoor Exposure - Non-Flat Coatings
Topcoat

System Reference Number	Number of Times a Coating was Used	Number of Components	VOC
213	1	1	247
102	1	1	400
206	1	1	135
237	1	1	250
201	1	1	0
210	1	1	0
217	1	1	250
110	1	1	400
218	1	1	170
112	1	1	400
203	1	1	0

Table A-8
Outdoor Exposure - Industrial
Maintenance
Primer

System Reference Number	Number of Times Coating was Used	Number of Components	VOC
901	1	2	108
920	1	2	288
917	1	1	417
910	1	2	0
902	2	1	400
914	2	1	0
919	1	2	170
930	1	1	419
932	1	2	284
933	1	2	282
904	1	1	49
906	1	1	138
908	1	1	60
912	1	2	0
922	1	1	231
923	1	1	382
925	1	2	395
927	1	2	320

Table A-10
Outdoor Exposure - Industrial
Maintenance
Midcoat

System Reference Number	Number of Times Coating was Used	Number of Components	VOC
932	1	2	284
928	1	2	275

Table A-9
Outdoor Exposure - Industrial
Maintenance
Topcoat

System Reference Number	Number of Times Coating was Used	Number of Components	VOC
901	1	2	108
921	1	2	120
918	1	1	411
911	1	2	0
903	1	1	420
10	1	1	420
915	2	1	0

916	2	1	0
919	1	2	170
931	1	1	385
932	1	2	284
905	2	2	55
907	2	1	208
909	1	1	120
913	2	2	0
922	1	1	231
924	1	1	422
925	1	2	395
929	1	2	295
934	1	2	388

Table A-11
Accelerated Weathering Systems

System Reference Designator	System Reference Numbers	Average Coating VOC
QDS-01	101-102-1	420
QDS-03	109-110	425
QDS-04	111-111-112	400
NFS-01	301-201	0.5
NFS-05	322-206	125
NFS-09	325-210	0
NFS-12	328-213	298.5
NFS-15	331-237	250
NFS-18	332-217	250
QDNFS-01	111-218	285
NFS-16	310-215-215	
NFS-17	315-216	VOC Unknown
IMCS-01	901-901	108
IMCS-02	902-903	410
IMCS-03	904-905-905	53
IMCS-04	906-907-907	185
IMCS-05	908-909	90
IMCS-06	910-911	0
IMCS-07	912-913-913	0
IMCS-08	914-915-915	0
IMCS-09	914-916-916	0
IMCS-10	917-918	414
IMCS-11	919-919	170
IMCS-12	920-921	204
IMCS-13	922-922	231
IMCS-14	923-924	402
IMCS-15	925-925	395
IMCS-16	927-928-929	297
IMCS-17	930-931	402
IMCS-18	932-932	284
IMCS-19	933-932-934	318
IMCS-20	902-10	410

Table A-12
Outdoor Exposure Systems

System Reference Designator	System Reference Number	NTS Number	Resin Type
IMCS-01	901-901-2	S01 Y28 T660	Siloxirane
IMCS-01	901-901-3		
IMCS-02	902-903-6	S01 Y27 T660	Epoxy Ester/Silicone
IMCS-02	902-903-7		
IMCS-03	904-905-905-6	S01 Y28 T660	Zinc/Urethane
IMCS-03	904-905-905-7		
IMCS-04	906-907-907-6	S01 Y29 T660	Acrylic/Acrylic
IMCS-04	906-907-907-7		

IMCS-05	908-909-2	S01 Y31 T660	Acrylic/Acrylic
IMCS-05	908-909-3		
IMCS-06	910-911-2	S01 Y30 T660	Epoxy/Urethane
IMCS-06	910-911-3		
IMCS-07	912-913-913-2	S01 Y32 T666	Novolac
IMCS-07	912-913-913-3		
IMCS-08	914-915-915-4	S01 Y33 T666	Butadiene-Epoxy/Urethane
IMCS-08	914-915-915-5		
IMCS-09	914-916-916-2	S01 Y34 T660	Butadiene-Epoxy/Epoxy
IMCS-09	914-916-916-3		
IMCS-10	917-918-2	S01 Y35 T660	Alkyd/Urethane Alkyd
IMCS-10	917-918-3		
IMCS-11	919-919-2	S01 Y36 T660	Epoxy
IMCS-11	919-919-3		
IMCS-12	920-921-2	S01 Y37 T660	Epoxy/Siloxane
IMCS-12	920-921-3		
IMCS-13	922-922-6	S01 Y38 T660	Acrylic
IMCS-13	922-922-7		
IMCS-14	923-924-6	S01 Y39 T660	Alkyd/Alkyd
IMCS-14	923-924-7		
IMCS-15	925-925-6	S01 Y40 T660	Epoxy
IMCS-15	925-925-7		
IMCS-16	927-928-929-6	S01 Y41 T660	Epoxy/Epoxy/Urethane
IMCS-16	927-928-929-7		
IMCS-17	930-931-7	S01 Y42 T660	Alkyd/Alkyd
IMCS-17	930-931-8		
IMCS-18	932-932-6	S01 Y43 T660	Epoxy
IMCS-18	932-932-7		
IMCS-19	933-932-934-2	S01 Y44 T660	Zinc/Epoxy/Urethane
IMCS-19	933-932-934-3		
IMCS-20	902-010-6	S01 Y48 T660	Epoxy Ester/Urethane
IMCS-20	902-010-4		
NFS-01	301-201-4	W02 Y07 T650	Copolymer Latex/Acrylic Latex
NFS-01	301-201-6		
NFS-05	322-206-4	W02 Y11 T650	Acrylic
NFS-05	322-206-6		
NFS-09	325-210-4	W02 Y15 T650	Acrylic
NFS-09	325-210-6		
NFS-12	328-213-5	W02 Y18 T650	Alkyd/Acrylic
NFS-12	328-213-6		
NFS-15	331-237-3	W02 Y21 T650	Acrylic
NFS-15	331-237-5		
NFS-18	332-217-3	W02 Y24 T650	Acrylic
NFS-18	332-217-5		
QDNFS-01	111-218-6	W02 Y47 T650	Alkyd/Alkyd
QDNFS-01	111-218-8		
QDS-01	101-102-3	W02 Y01 T650	Alkyd/Alkyd
QDS-01	101-102-5		
QDS-03	109-110-4	W02 Y05 T650	Alkyd
QDS-03	109-110-6		

QDS-04	111-111-112-3	W02 Y06 T650	Alkyd/Alkyd
QDS-04	111-111-112-5		
NFS-21	334-203-1	W02 Y09 T650	Acrylic
NFS-21	334-203-5		

Appendix B

Details of Testing Results and Ratings

Table B-1

Results of the Emmaqua Accelerated Weathering Tests

System Reference Designator	System Reference Numbers	Average Coating VOC	Total Dry Film Thickness, mils	Pre-test Appearance (1)	PRE-TEST			85 DAY (280 MJ/m ²) EXPOSURE								
					Gloss			CIE	E313 Yellow	Gloss			CIE	E313 Yellow	Artificial Ranking of Visual	VISUAL (1), (2) & (3)
					20°	60°	85°			20°	60°	85°				
QDS-01	101-102-1	420	4.0	High gloss, uniform, white	54.0	86.9	95.2	65.75	6.74	13.7	59.3	84.2	77.25	3.07	8	Semi-gloss, white
		420	7.0	High gloss, uniform, white	36.5	78.2	75.1	74.19	4.03	10.8	55.9	69.5	77.30	2.99	8	Semi-gloss, white
		420	5.0	High gloss, uniform, white	44.3	82.1	89.8	73.26	4.33	11.4	56.7	74.6	77.98	2.82	8	Semi-gloss, white
QDS-03	109-110	425	3.0	Medium gloss, uniform, off-white	29.2	74.1	77.6	70.42	6.13	3.4	21.2	63.5	73.61	4.78	3	Off-white, flat, #8 flaking & #8 cracking
		425	5.0	Medium gloss, uniform, off-white	18.2	61.2	64.6	72.41	4.71	2.7	17.2	48.7	76.87	2.79	3	Off-white, flat, #8 flaking & #8 cracking
		425	3.5	Medium gloss, uniform, off-white	15.6	56.0	60.4	71.98	4.69	2.8	17.0	40.8	74.50	3.44	3	Off-white, flat, #8 flaking & #8 cracking
QDS-04	111-111-112	400	7.5	Satin, uniform, white	11.6	48.6	64.5	46.58	13.49	1.9	9.2	33	77.09	3.72	4	Off-white, flat, #2 flaking
		400	5.5	Satin, uniform, white	11.7	49.1	69.2	52.59	11.61	2.1	10.1	45.4	78.40	3.3	4	Off-white, flat, #2 flaking
		400	5.0	Satin, uniform, white	11.3	47.8	54.6	59.45	8.34	2.5	14.7	47.8	78.3	2.15	4	Off white, flat, #2 flaking
NFS-01	301-201	0.5	2.5	Satin, flat, uniform, off-white	6.0	33.1	39.4	69.71	5.74	2.1	11.9	23.5	64.79	6.73	3	Off white, flat, #6 cracking
		0.5	3.0	Satin, flat, uniform, off-white	8.2	42.8	49.3	66.67	7.4	3.2	25.9	43.8	64.06	7.71	3	Off white, flat, #6 cracking & #8 flaking
		0.5	3.5	Satin, flat, uniform, off-white	6.4	34.8	39.9	70.43	5.51	2.5	15.9	33.3	66.36	6.11	3	Off white, flat, #6 cracking & #8 flaking
NFS-05	322-206	125	4.5	Flat, ridged, white	2.3	8.5	18.4	72.63	5.4	1.9	3.5	12.5	65.24	7.19	7	Flat, white
		125	4.5	Flat, ridged, white	2.2	7.0	14.2	71.32	5.97	1.8	3.3	12.5	64.86	7.39	7	Flat, white
		125	3.5	Flat, ridged, white	2.2	8.0	16.5	72.03	5.7	1.9	3.5	12.6	64.66	7.36	7	Flat, white
NFS-09	325-210	0	6.0	Off-white, flat, uniform	2.2	6.6	7.0	75.59	4.26	2	4.5	6.5	77.56	2.74	7	Flat, white
		0	6.5	Off-white, flat, uniform	2.2	6.5	7.4	75.32	4.51	2	4.7	6.8	78.68	2.89	7	Flat, white
		0	6.0	Off-white, flat, uniform	2.2	6.6	6.7	74.46	4.48	2	4.6	6.6	78.38	2.54	7	Flat, white
NFS-12	328-213	298.5	5.0	Satin flat, white	3.5	19.3	18.5	72.67	3.74	2.2	14.3	17	66.61	4.76	8	Satin flat, white
		298.5	4.5	Satin flat, white	3.4	18.5	17.5	70.1	4.56	2.9	14.8	16.9	68.65	4.14	8	Satin flat, white
		298.5	3.0	Satin flat, white	3.6	20.2	20.7	68.73	5.07	2.3	14.5	19	68.39	4.39	8	Satin flat, white
NFS-15	331-237	250	3.5	Satin, flat, ivory	3.9	25.4	43.1	43.64	13.05	1.7	7.2	36.5	26.21	17.19	7	Flat, ivory
		250	3.0	Satin, flat, ivory	3.7	23.9	39.2	43.07	13.2	1.7	8	33.7	25.43	17.32	7	Flat, ivory
		250	2.5	Satin, flat, ivory	4.1	26.7	41.4	43.3	13.06	1.7	8.6	30	23.45	17.76	7	Flat, ivory
NFS-18	332-217	250	3.0	Semi-gloss, uniform, white	17.8	64.8	63.4	76.72	4.79	12.5	58.5	61.1	84.37	2.04	8	Semi-gloss, white
		250	3.0	Semi-gloss, uniform, white	28.1	77.7	79.4	77.31	4.8	13.8	60.8	71.6	84.29	2.33	8	Semi-gloss, white
		250	3.0	Semi-gloss, uniform, white	25.8	74.3	73.9	76.45	4.98	16.1	66.7	65	83.91	2.42	8	Semi-gloss, white
QDNFS-01	111-218	285	5.0	Semi-gloss, wrinkled at corners, ivory	20.6	65.4	60.8	39.49	14.74	9.4	48.5	57.4	53.55	10.46	5	Satin, ivory, #6 flaking along edge
		285	5.0	Semi-gloss, wrinkled at corners, ivory	17.7	62.4	65.8	41.51	13.88	7.7	41.5	61.4	59.30	8.59	5	Satin, ivory, #6 flaking along edge
		285	5.5	Semi-gloss, wrinkled at corners, ivory	18.2	62.4	65.2	42.95	13.52	6.7	40.5	61.1	60.63	8.18	5	Satin, ivory, #6 flaking along edge
NFS-16	310-215-215			N/A (Insufficient coating to test)												
NFS-17	315-216	VOC Unknown	5.5	Flat, uniform, off-white	2.0	5.4	6.5	56.89	8.74	1.8	2.8	6.3	57.6	8.61		Flat, off-white
			5.0	Flat, uniform, off-white	2.0	5.3	6.6	58	8.23	1.8	2.9	6.4	57.63	8.45		Flat, off-white
			7.0	Flat, uniform, off-white	2.0	5.4	6.5	56.84	8.71	1.8	2.9	6.5	57.05	8.76		Flat, off-white
IMCS-01	901-901	108	13.6	Gloss, white, small particles	77.4	97.2	96.3	41.26	11.03	1.3	1.9	3.3	60.07	36.38	3	Flat, yellow
		108	14.1	Gloss, white, small particles	76.7	101.2	90.2	43.66	9.77	1.2	1.9	3.2	67.41	37.66	3	Flat, yellow
		108	19.0	Gloss, white, small particles	70.4	101.4	90.4	43.8	9.95	1.2	1.8	3.2	68.13	37.72	3	Flat, yellow
IMCS-02	902-903	410	2.1	Semi-gloss, uniform, off-white	30.4	73.2	66.4	51.77	10.86	19.4	66.4	60.1	79.88	2.05	6	Semi-gloss, white
		410	2.3	Semi-gloss, uniform, off-white	38.2	79.4	66.9	53.95	10.46	18.3	63.2	55.2	80.26	2.4	6	Semi-gloss, white
		410	2.4	Semi-gloss, uniform, off-white	41.4	82.4	71.1	51.23	11.19	24.9	75.1	64.5	80.18	1.93	6	Semi-gloss, white
IMCS-03	904-905-905	53	8.1	Gloss, uniform, lots of particles, white	65.7	91.3	83.4	72.95	3.33	44.2	87.3					

Table B-1

Results:

System Reference Designator	Delta Gloss										Delta CIE	Delta E313 Yellow	% Avg.			
	Delta Gloss					20°	% 75%	60°	% 32%	Avg. % 30%						
	20°	%	60°	%	Avg. %											
QDS-01	40.3	75%	27.6	32%		11.0	12%	-11.5	-17%		-3.7	-54%	-38%			
	25.7	70%	22.3	29%	30%	5.6	7%	-3.1	-4%	-9%	-1.0	-26%				
	32.9	74%	25.4	31%		15.2	17%	-4.7	-6%		-1.5	-35%				
QDS-03	25.8	88%	52.9	71%		14.1	18%	-3.2	-5%		-1.4	-22%	-30%			
	15.5	85%	44.0	72%	71%	15.9	25%	-4.5	-6%	-5%	-1.9	-41%				
	12.8	82%	39.0	70%		19.6	32%	-2.5	-4%		-1.3	-27%				
QDS-04	9.7	84%	39.4	81%		31.5	49%	-30.5	-66%		-9.8	-72%	-73%			
	9.6	82%	39.0	79%	77%	23.8	34%	-25.8	-49%	-49%	-8.3	-72%				
	8.8	78%	33.1	69%		6.8	12%	-18.9	-32%		-6.2	-74%				
NFS-01	3.9	65%	21.2	64%		15.9	40%	4.9	7%		1.0	17%	11%			
	5.0	61%	16.9	39%	53%	5.5	11%	2.6	4%	6%	0.3	4%				
	3.9	61%	18.9	54%		6.6	17%	4.1	6%		0.6	11%				
NFS-05	0.4	17%	5.0	59%		5.9	32%	7.4	10%		1.8	33%	29%			
	0.4	18%	3.7	53%	56%	1.7	12%	6.5	9%	10%	1.4	24%				
	0.3	14%	4.5	56%		3.9	24%	7.4	10%		1.7	29%				
NFS-09	0.2	9%	2.1	32%		0.5	7%	-2.0	-3%		-1.5	-36%	-38%			
	0.2	9%	1.8	28%	30%	0.6	8%	-3.4	-4%	-4%	-1.6	-36%				
	0.2	9%	2.0	30%		0.1	1%	-3.9	-5%		-1.9	-43%				
NFS-12	1.3	37%	5.0	26%		1.5	8%	6.1	8%		1.0	27%	2%			
	0.5	15%	3.7	20%	25%	0.6	3%	1.4	2%	4%	-0.4	-9%				
	1.3	36%	5.7	28%		1.7	8%	0.3	0%		-0.7	-13%				
NFS-15	2.2	56%	18.2	72%		6.6	15%	17.4	40%		4.1	32%	33%			
	2.0	54%	15.9	67%	69%	5.5	14%	17.6	41%	42%	4.1	31%				
	2.4	59%	18.1	68%		11.4	28%	19.9	46%		4.7	36%				
NFS-18	5.3	30%	6.3	10%		2.3	4%	-7.7	-10%		-2.8	-57%	-53%			
	14.3	51%	16.9	22%	14%	7.8	10%	-7.0	-9%	-10%	-2.5	-51%				
	9.7	38%	7.6	10%		8.9	12%	-7.5	-10%		-2.6	-51%				
QDNFS-01	11.2	54%	16.9	26%		3.4	6%	-14.1	-36%		-4.3	-29%	-36%			
	10.0	56%	20.9	33%	31%	4.4	7%	-17.8	-43%	-40%	-5.3	-38%				
	11.5	63%	21.9	35%		4.1	6%	-17.7	-41%		-5.3	-39%				
NFS-16																
NFS-17	0.2	10%	2.6	48%		0.2	3%	-0.7	-1%		-0.1	-1%	1%			
	0.2	10%	2.4	45%	47%	0.2	3%	0.4	1%	0%	0.2	3%				
	0.2	10%	2.5	46%		0.0	0%	-0.2	0%		0.0	1%				
IMCS-01	76.1	98%	95.3	98%		93.0	97%	-18.8	-46%		25.4	230%	265%			
	75.5	98%	99.3	98%	98%	87.0	96%	-23.8	-54%	-52%	27.9	285%				
	69.2	98%	99.6	98%		87.2	96%	-24.3	-56%		27.8	279%				
IMCS-02	11.0	36%	6.8	9%		6.3	9%	-28.1	-54%		-8.8	-81%	-80%			
	19.9	52%	16.2	20%	13%	11.7	17%	-26.3	-49%	-53%	-8.1	-77%				
	16.5	40%	7.3	9%		6.6	9%	-29.0	-57%		-9.3	-83%				
IMCS-03	21.5	33%	4.0	4%		10.3	12%	-4.0	-5%		-0.5	-14%	-13%			
	14.2	19%	1.1	1%	2%	2.1	3%	-1.7	-2%	-3%	-0.5	-13%				
	7.8	12%	0.9	1%		4.3	6%	-1.5	-2%		-0.4	-13%				
IMCS-04	1.2	5%	0.2	0%		-1.4	-2%	-2.0	-3%		-0.7	-21%	-27%			
	2.4	12%	5.0	8%	8%	-6.9	-10%	-4.4	-6%	-5%	-1.1	-27%				
	4.9	23%	10.8	15%		-2.0	-3%	-4.7	-7%		-1.4	-33%				
IMCS-05	7.4	42%	6.0	10%		-3.1	-5%	4.8	7%		1.0	22%	25%			
	5.6	38%	4.2	7%	13%	-1.5	-3%	5.6	8%	8%	1.2	26%				
	8.3	49%	12.8	21%		-0.4	-1%	6.5	9%		1.3	29%				

System Reference Designator	System Reference Numbers	Average Coating VOC	Total Dry Film Thickness, mils	Pre-test Appearance (1)	PRE-TEST						85 DAY (280 MJ/m ²) EXPOSURE								
					Gloss			CIE	E313 Yellow	Gloss			CIE	E313 Yellow	Artificial Ranking of Visual	VISUAL (1), (2) & (3)			
					20°	60°	85°			20°	60°	85°							
IMCS-06	910-911	0	7.3	Satin gloss, slight rough texture in center, white	52.5	84.5	75.0	74.63	4.28	51.4	82.4	74.6	74.99	4.38	6	Satin gloss, white			
		0	8.8	Satin gloss, slight rough texture in center, white	50.5	81.4	74.9	74.28	4.54	40.4	78.3	73.8	74.98	4.62	6	Satin gloss, white			
		0	8.9	Satin gloss, slight rough texture in center, white	60.9	88.8	86.4	73.65	4.75	42.1	81.6	83.2	73.75	4.87	6	Satin gloss, white			
IMCS-07	912-913-913	0	23.4	Satin, gray, uniform, particles	18.2	54.6	79.9	38.11	2.82	0.9	1.5	4.3	65.86	32.87	3	Flat, yellow, no visual particles			
		0	27.5	Satin, gray, uniform, particles	16.2	49.6	71.3	39.06	2.86	0.9	1.5	3.2	68.57	33.41	3	Flat, yellow, no visual particles			
		0	29.8	Satin, gray, uniform, particles	18.3	51.3	74.7	37.67	2.92	0.9	1.5	4	67.10	33.16	3	Flat, yellow, no visual particles			
IMCS-08	914-915-915	0	7.2	Satin, semi-transparent, particles, white	36.1	78.8	74.4	72.27	2.88	15.1	55.3	67	73.96	2.31	3	In, white, semi-transparent, numerous small parti			
		0	7.1	Satin, semi-transparent, particles, white	32.7	76.7	75.8	72.86	3.22	14.1	53.2	65.5	84.43	2.74	3	In, white, semi-transparent, numerous small parti			
		0	6.6	Satin, semi-transparent, particles, white	33.2	76.8	78.2	73.04	2.84	14.5	54.9	68.9	74.31	2.38	3	In, white, semi-transparent, numerous small parti			
IMCS-09	914-916-916	0	10.8	Satin, ivory, small particles	44.4	75.4	81.5	24.31	18.03	12.6	52.7	74.1	61.36	6.66	5	Satin, white			
		0	7.5	Satin, ivory, small particles	39.7	71.8	70.4	25.38	17.78	9.4	46.4	65.3	61.23	6.67	5	Satin, white			
		0	6.8	Satin, ivory, small particles	34.1	70.4	68.0	27.7	17.15	10.9	49.5	66.3	61.42	6.65	5	Satin, white			
IMCS-10	917-918	414	3.4	Gloss, uniform, white	45.1	84.4	80.7	67.88	7.18	33.6	78.7	79	75.94	4.56	7	Gloss, white			
		414	2.8	Gloss, uniform, white	44.2	82.4	73.8	68.07	6.94	30	75	70.6	77.01	4.11	7	Gloss, white			
		414	2.9	Gloss, uniform, white	48.2	85.2	80.1	69.24	6.87	28.7	69.2	70.8	76.39	4.43	7	Gloss, white			
IMCS-11	919-919	170	8.1	Satin-flat, uniform, ivory	9.7	42.3	34.2	35.03	15.02	1.7	2.5	4.7	1.22	24.33	3	Flat, yellow			
		170	8.0	Satin-flat, uniform, ivory	13.3	48.9	43.2	34.27	15.35	1.7	2.6	6.4	2.11	24.13	3	Flat, yellow			
		170	9.2	Satin-flat, uniform, ivory	11.3	45.2	39.2	34.66	15.16	1.7	2.5	5.2	1.90	24.01	3	Flat, yellow			
IMCS-12	920-921	204	7.7	High gloss, uniform, white	75.9	93.6	95.1	83.71	2.1	63.4	90.4	92.5	85.9	1.47	8	High gloss, white			
		204	11.6	High gloss, uniform, white	69.8	94.6	90.6	82.39	3.16	65.5	88	87.9	85.41	2.32	8	High gloss, white			
		204	6.0	High gloss, uniform, white	76.7	93.6	97.9	85.25	1.7	64.2	88.6	94.6	86.18	1.2	8	High gloss, white			
IMCS-13	922-922	231	4.7	Flat, eggshell, # 2 rust spots covering surface	2.0	3.8	4.1	66.04	6.74	1.8	2.9	4.2	62.9	5.95	5	Flat, eggshell, # 2 rust			
		231	4.1	Flat, eggshell, # 1 rust spots covering surface	2.0	3.7	4.0	65.5	6.59	1.8	3.4	4.6	63.99	5.96	5	Flat, eggshell, # 1 rust			
		231	2.7	Flat, eggshell, # 1 rust spots covering surface	2.1	3.6	3.6	65.66	6.01	1.7	2.9	3.9	55.23	7.99	5	Flat, eggshell, # 1 rust			
IMCS-14	923-924	402	3.2	Satin, ridged by drawdown bar, off-white	22.0	63.9	74.1	68.93	6.28	10.8	55.7	77.8	82.46	1.99	5	Satin, white			
		402	2.7	Satin, ridged by drawdown bar, off-white	21.3	62.4	77.8	68.83	6.11	12.5	58.5	80	83.29	1.75	5	Satin, white			
		402	2.9	Satin, ridged by drawdown bar, off-white	22.4	63.6	74.5	69.9	5.96	14.9	61.8	84.2	83.55	1.69	5	Satin, white			
IMCS-15	925-925	395	5.4	Satin-flat, uniform, off-white	9.4	43.4	55.4	76.27	2.03	1.8	3.3	28	65.8	5.1	3	Flat, off-white			
		395	5.2	Satin-flat, uniform, off-white	10.1	45.1	55.3	75.97	2.16	1.8	3.3	27.4	65.43	5.4	3	Flat, off-white			
		395	5.7	Satin-flat, uniform, off-white	10.2	45.6	55.7	76.73	2.12	1.8	3.1	23.3	65.69	5.27	3	Flat, off-white			
IMCS-16	927-928-929	297	9.1	Satin-gloss, uniform, white	37.8	78.4	65.0	76.95	2.42	24.2	70.8	64.8	77.63	2.43	6	Satin-gloss, white			
		297	8.5	Satin-gloss, uniform, white	35.1	76.4	71.7	76.3	2.68	20.5	68	71.9	77.67	2.62	6	Satin-gloss, white			
		297	9.0	Satin-gloss, uniform, white	35.6	77.3	68.7	77.53	2.51	22.8	68.1	66.9	78.08	2.55	6	Satin-gloss, white			
IMCS-17	930-931																		

System Reference Designator	Delta Gloss												Avg. %	
	Delta CIE						Delta E313 Yellow							
	20°	%	60°	%	Avg. %	85°	%	%	Avg. %	%				
IMCS-06	1.1	2%	2.1	2%		0.4	1%	-0.4	0%		0.1	2%		
	10.1	20%	3.1	4%	5%	1.1	1%	-0.7	-1%	-1%	0.1	2%	2%	
	18.8	31%	7.2	8%		3.2	4%	-0.1	0%		0.1	3%		
IMCS-07	17.3	95%	53.1	97%		75.6	95%	-27.8	-73%		30.1	1066%		
	15.3	94%	48.1	97%	97%	68.1	96%	-29.5	-76%	-75%	30.6	1068%	1056%	
	17.4	95%	49.8	97%		70.7	95%	-29.4	-78%		30.2	1036%		
IMCS-08	21.0	58%	23.5	30%		7.4	10%	-1.7	-2%		-0.6	-20%		
	18.6	57%	23.5	31%	30%	10.3	14%	-11.6	-16%	-7%	-0.5	-15%	-17%	
	18.7	56%	21.9	29%		9.3	12%	-1.3	-2%		-0.5	-16%		
IMCS-09	31.8	72%	22.7	30%		7.4	9%	-37.1	-152%		-11.4	-63%		
	30.3	76%	25.4	35%	32%	5.1	7%	-35.9	-141%	-138%	-11.1	-62%	-62%	
	23.2	68%	20.9	30%		1.7	3%	-33.7	-122%		-10.5	-61%		
IMCS-10	11.5	25%	5.7	7%		1.7	2%	-8.1	-12%		-2.6	-36%		
	14.2	32%	7.4	9%	12%	3.2	4%	-8.9	-13%	-12%	-2.8	-41%	-38%	
	19.5	40%	16.0	19%		9.3	12%	-7.2	-10%		-2.4	-36%		
IMCS-11	8.0	82%	39.8	94%		29.5	86%	33.8	97%		9.3	62%		
	11.6	87%	46.3	95%	94%	36.8	85%	32.2	94%	95%	8.8	57%	59%	
	9.6	85%	42.7	94%		34.0	87%	32.8	95%		8.9	58%		
IMCS-12	12.5	16%	3.2	3%		2.6	3%	-2.2	-3%		-0.6	-30%		
	4.3	6%	6.6	7%	5%	2.7	3%	-3.0	-4%	-2%	-0.8	-27%	-29%	
	12.5	16%	5.0	5%		3.3	3%	-0.9	-1%		-0.5	-29%		
IMCS-13	0.2	10%	0.9	24%		-0.1	-2%	3.1	5%		-0.8	-12%		
	0.2	10%	0.3	8%	17%	-0.6	-15%	1.5	2%	8%	-0.6	-10%	4%	
	0.4	19%	0.7	19%		-0.3	-8%	10.4	16%		2.0	33%		
IMCS-14	11.2	51%	8.2	13%		-3.7	-5%	-13.5	-20%		-4.3	-68%		
	8.8	41%	3.9	6%	7%	-2.2	-3%	-14.5	-21%	-20%	-4.4	-71%	-70%	
	7.5	33%	1.8	3%		-9.7	-13%	-13.7	-20%		-4.3	-72%		
IMCS-15	7.6	81%	40.1	92%		27.4	49%	10.5	14%		3.1	151%		
	8.3	82%	41.8	93%	93%	27.9	50%	10.5	14%	14%	3.2	150%	150%	
	8.4	82%	42.5	93%		32.4	58%	11.0	14%		3.2	149%		
IMCS-16	13.6	36%	7.6	10%		0.2	0%	-0.7	-1%		0.0	0%		
	14.6	42%	8.4	11%	11%	-0.2	0%	-1.4	-2%	-1%	-0.1	-2%	0%	
	12.8	36%	9.2	12%		1.8	3%	-0.5	-1%		0.0	2%		
IMCS-17	14.3	78%	24.5	43%		6.2	10%	-15.7	-25%		-4.8	-58%		
	12.0	73%	20.7	38%	39%	1.9	3%	-17.8	-30%	-29%	-5.3	-59%	-59%	
	12.9	70%	21.7	37%		-0.5	-1%	-18.4	-31%		-5.6	-60%		
IMCS-18	15.6	89%	57.3	95%		49.0	67%	9.0	13%		2.9	45%		
	15.8	89%	57.7	95%	95%	45.4	65%	11.3	16%	14%	3.4	62%	48%	
	19.2	91%	62.9	95%		47.1	64%	8.6	13%		2.4	36%		
IMCS-19	27.8	32%	11.5	12%		1.7	2%	-0.1	0%		0.1	-15%		
	31.8	39%	16.4	17%	15%	3.5	4%	1.3	2%	1%	0.2	-46%	-23%	
	32.8	40%	15.6	16%		3.8	4%	0.6	1%		0.1	-9%		
IMCS-20	40.6	56%	16.7	18%		10.4	12%	-2.5	-3%		-0.8	-41%		
	41.6	58%	15.0	16%	16%	8.2	9%	7.5	8%	1%	-0.9	-48%	-45%	
	34.7	45%	11.9	13%		3.2	4%	-2.3	-3%		-0.8	-46%		

Table B-2**NTS Outdoor Exposure Initial and Final Test Results - Saugus**

SRN	SRD	NTS Number	Resin Type	System VOC	Primer VOC	Topcoat VOC	Average VOC of coating	Final Results			
								Gloss 20	Gloss 60	Gloss 85	Chalk
Wood Coatings											
111-218-6	QDNFS-01	W02 Y47 T650	Alkyd/Alkyd	570	400	170	285	2.6	9.5	55.6	None
111-218-8	QDNFS-01	W02 Y47 T650	Alkyd/Alkyd	570	400	170	285	2.2	6.8	50.4	None
322-206-4	NFS-05	W02 Y11 T650	Acrylic	250	115	135	125	1.9	4.2	9.8	None
322-206-6	NFS-05	W02 Y11 T650	Acrylic	250	115	135	125	1.9	4.5	10.2	None
325-210-4	NFS-09	W02 Y15 T650	Acrylic	0	0	0	0	1.9	4.1	7.2	None
325-210-5	NFS-09	W02 Y15 T650	Acrylic	0	0	0	0	1.9	4.1	6.8	None
332-217-3	NFS-18	W02 Y24 T650	Acrylic	500	250	250	250	16.3	63.7	72.2	None
332-217-5	NFS-18	W02 Y24 T650	Acrylic	500	250	250	250	15.1	58.1	72.8	None
111-111-112-3	QDS-04	W02 Y06 T650	Alkyd/Alkyd	1200	400/400	400	400	1.9	8.5	50.9	None
111-111-112-5	QDS-04	W02 Y06 T650	Alkyd/Alkyd	1200	400/400	400	400	2	10.6	44.6	None
101-102-3	QDS-01	W02 Y01 T650	Alkyd/Alkyd	840	440	400	420	1.9	18.2	44.9	None
101-102-5	QDS-01	W02 Y01 T650	Alkyd/Alkyd	840	440	400	420	2	10.6	48.5	None
328-213-5	NFS-12	W02 Y18 T650	Alkyd/Acrylic	597	350	247	299	1.9	7.2	10.6	None
328-213-6	NFS-12	W02 Y18 T650	Alkyd/Acrylic	597	350	247	299	2	11.9	19.9	None
334-203-1	NFS-21	W02 Y09 T650	Acrylic	0	0	0	0	1.7	2.7	6.5	None
334-203-5	NFS-21	W02 Y09 T650	Acrylic	0	0	0	0	1.7	2.7	7.5	None
331-237-3	NFS-15	W02 Y21 T650	Acrylic	500	250	250	250	1.7	4.8	20.5	None
331-237-5	NFS-15	W02 Y21 T650	Acrylic	500	250	250	250	1.7	4.8	18.5	None
301-201-4	NFS-01	W02 Y07 T650	Copolymer Latex/Acrylic Latex	1	1	0	0.5	2.2	15.5	30.4	None
301-201-6	NFS-01	W02 Y07 T650	Copolymer Latex/Acrylic Latex	1	1	0	0.5	2.3	20.1	48.6	None
109-110-4	QDS-03	W02 Y05 T650	Alkyd	850	450	400	425	2	13.3	52.4	None
109-110-6	QDS-03	W02 Y05 T650	Alkyd	850	450	400	425	2	12.6	55.5	None

SRN	SRD	NTS Number	Resin Type	System VOC	Primer VOC	Topcoat VOC	Average VOC of coating	Gloss			Chalk
Industrial Maintenance											
930-931-7	IMCS-17	S01 Y42 T660	Alkyd/Alkyd	804	419	385	402	1.9	8.3	43.8	None
930-931-8	IMCS-17	S01 Y42 T660	Alkyd/Alkyd	804	419	385	402	1.9	6.5	34.5	None
923-924-6	IMCS-14	S01 Y39 T660	Alkyd/Alkyd	805	382	422	402	2.4	28.4	74.6	None
923-924-7	IMCS-14	S01 Y39 T660	Alkyd/Alkyd	805	382	422	402	2.2	23.6	73.9	None
925-925-6	IMCS-15	S01 Y40 T660	Epoxy	790	395	395	395	2	2.8	5.3	Gr6
925-925-7	IMCS-15	S01 Y40 T660	Epoxy	790	395	395	395	1.8	2.4	5.2	Gr6
932-932-6	IMCS-18	S01 Y43 T660	Epoxy	568	284	284	284	1.9	2.7	7.7	Gr>8
932-932-7	IMCS-18	S01 Y43 T660	Epoxy	568	284	284	284	1.8	2.6	7.3	Gr>8
922-922-6	IMCS-13	S01 Y38 T660	Acrylic	462	231	231	231	1.5	2.5	3.2	Gr6
922-922-7	IMCS-13	S01 Y38 T660	Acrylic	462	231	231	231	1.5	2.3	2.7	Gr6
906-907-907-6	IMCS-04	S01 Y29 T660	Acrylic/Acrylic	554	138	208/208	185	2.2	26.5	76.9	None
906-907-907-7	IMCS-04	S01 Y29 T660	Acrylic/Acrylic	554	138	208/208	185	2.1	21.4	72.7	None
908-909-2	IMCS-05	S01 Y31 T660	Acrylic/Acrylic	180	60	120	90	2.1	12.4	41.5	None
908-909-3	IMCS-05	S01 Y31 T660	Acrylic/Acrylic	180	60	120	90	1.9	12.2	43.6	None
914-915-915-4	IMCS-08	S01 Y33 T666	Butadiene-Epoxy/Urethane	0	0	0	0	3.6	20.3	31.1	None
914-915-915-5	IMCS-08	S01 Y33 T666	Butadiene-Epoxy/Urethane	0	0	0	0	6.1	30.7	54.1	None
902-903-6	IMCS-02	S01 Y27 T660	Epoxy Ester/Silicone	820	400	420	410	2.9	33.5	53.5	None
902-903-7	IMCS-02	S01 Y27 T660	Epoxy Ester/Silicone	820	400	420	410	3.3	33.1	53.5	None
910-911-6	IMCS-06	S01 Y30 T660	Epoxy/Urethane	0	0	0	0	12.2	42.7	78.8	None
910-911-7	IMCS-06	S01 Y30 T660	Epoxy/Urethane	0	0	0	0	7.5	38.6	61.3	None
919-919-2	IMCS-11	S01 Y36 T660	Epoxy	340	170	170	170	1.6	2.1	1.6	Gr6
919-919-3	IMCS-11	S01 Y36 T660	Epoxy	340	170	170	170	1.6	2	1.2	Gr6
901-901-2	IMCS-01	S01 Y28 T660	Siloixane	216	108	108	108	1.2	1.8	1.6	Gr8
901-901-3	IMCS-01	S01 Y28 T660	Siloixane	216	108	108	108	1.4	2.2	1.6	Gr8
927-928-929-6	IMCS-16	S01 Y41 T660	Epoxy/Epoxy/Urethane	890	320/275	295	297	11.4	47.9	84.6	None
927-928-929-7	IMCS-16	S01 Y41 T660	Epoxy/Epoxy/Urethane	890	320/275	295	297	13.4	49.6	85.8	None
917-918-2	IMCS-10	S01 Y35 T660	Alkyd/Urethane Alkyd	828	417	411	414	2.9	28.2	85.4	None
917-918-3	IMCS-10	S01 Y35 T660	Alkyd/Urethane Alkyd	828	417	411	414	2.5	21.2	76.8	None
912-913-913-2	IMCS-07	S01 Y32 T666	Novolac	0	0	0	0	0.9	1.3	0.8	Gr6
912-913-913-3	IMCS-07	S01 Y32 T666	Novolac	0	0	0	0	0.9	1.3	0.7	Gr6
933-932-934-2	IMCS-19	S01 Y44 T660	Zinc/Epoxy/Urethane	954	282/284	388	318	3.7	35.3	85.2	None
933-932-934-3	IMCS-19	S01 Y44 T660	Zinc/Epoxy/Urethane	954	282/284	388	318	3	30.6	74.5	None
914-916-916-2	IMCS-09	S01 Y34 T660	Butadiene-Epoxy/Epoxy	0	0	0	0	8.6	46.9	65.2	None
914-916-916-3	IMCS-09	S01 Y34 T660	Butadiene-Epoxy/Epoxy	0	0	0	0	8.6	45.9	65.4	None
920-921-2	IMCS-12	S01 Y37 T660	Epoxy/Siloxane	408	288	120	204	44.9	76.3	93.3	None

920-921-3	IMCS-12	S01 Y37 T660	Epoxy/Siloxane	408	288	120	204	37.1	74.2	78.8	None
904-905-905-6	IMCS-03	S01 Y28 T660	Zinc/Urethane	159	49	55/55	53	23.7	69.4	83.4	None
904-905-905-7	IMCS-03	S01 Y28 T660	Zinc/Urethane	159	49	55/55	53	21.3	63.5	83.3	None
902-010-6	IMCS-20	S01 Y48 T660	Epoxy Ester/Urethane	820	400	420	410	3.9	38.4	77.9	None
902-010-7	IMCS-20	S01 Y48 T660	Epoxy Ester/Urethane	820	400	420	410	3.6	32.6	78.3	None

Crack	Flake	Blister	Initial Results														
			Color		X	Y	Z	L	A	B	CIE	YELLOW	20	60	85	X	Y
End Gr8	Gr 2	0	79.96	84.87	82.18	93.83	-1	6.37	55.56	9.17	15.8	55.6	53	79.89	85.1	73.06	
End Gr8	0	0	80.16	85.11	82.66	93.93	-1.04	6.2	56.64	8.89	13.3	51.6	60.2	80.93	86.01	77.97	
0	0	0	77.32	81.43	80.63	92.32	0.22	4.94	58.48	7.37	2.1	6.3	13.5	84.12	88.89	90.02	
0	0	0	77.04	81.08	79.98	92.17	0.34	5.16	57.07	7.74	2.1	6.9	14.4	84.91	89.66	90.24	
0	0	0	78.21	82.58	84.26	92.83	-0.15	3.12	68.12	4.38	2.1	6.6	7.3	85.13	90.15	91.66	
0	0	0	78.01	82.39	83.88	92.75	-0.21	3.26	67.29	4.59	2.1	6.2	7.1	84.72	89.72	91.95	
0	0	0	85.38	90.67	93.35	96.27	-1.1	2.66	78.71	3.33	26.3	76	75.6	87.83	93.35	94.68	
0	0	0	85.41	90.68	93.42	96.28	-1.07	2.62	78.9	3.27	38.8	80.9	79.4	87.9	93.42	94.6	
Gr6	Gr4 (end)	0	82.68	87.4	89.5	94.91	-0.35	2.96	73.96	4.01	9.5	44.3	66.1	84.75	90.39	86.74	
Gr6	Gr4 (end)	0	79.22	83.83	86.79	93.38	-0.52	2.24	73.49	2.94	9.7	43.9	58.4	82.67	88.25	85.39	
Gr2	Gr2	Med Gr8	80.24	84.78	88.26	93.79	-0.28	1.9	76.05	2.39	25.2	71.6	78.4	82.55	87.71	88.6	
Gr2	Gr6	Med Gr8	81.51	86.11	89.53	94.36	-0.25	1.99	77.01	2.52	28	76.9	77.7	82.99	88.03	89.87	
0	0	0	75.7	80.07	82.02	91.71	-0.42	2.85	66.73	4	2.9	14.2	13	79.37	84.05	85.71	
Slight Edge >8	0	0	76.92	81.34	91.71	92.28	-0.4	3.02	67.27	4.26	3.7	21.2	21.3	80.59	85.41	86.85	
0	0	0	75.06	78.78	75.76	91.13	0.76	6.62	47.74	10.18	2.1	5.4	6.7	79.9	83.94	81.5	
0	0	0	74.96	78.67	75.71	91.09	0.76	6.58	47.78	10.12	2	5.2	6.9	80.17	84.15	82.02	
0	0 - yellowed	0	70.88	73.61	66.56	88.74	2.34	10.02	25.74	15.85	3	19.2	34.5	78.05	81.55	74.1	
0	0	0	70.65	73.49	67.13	88.68	2.09	9.43	28.38	14.95	3.1	20.6	34.8	77.36	80.88	73.33	
37411	0	Gr<8	79.02	83.87	83.15	93.39	-0.99	4.91	61.2	6.99	7.1	39.2	46.7	83.95	88.95	90.03	
<8	0	Gr8 few	82.01	86.94	85.11	94.71	-0.81	5.25	60.72	8.19	9.2	43.9	56.6	85.99	90.97	90.04	
Gr6	Gr<4	0	82.69	87.29	89.72	94.86	-0.14	2.73	74.91	3.71	17.7	58.6	66.3	82.81	87.77	88.18	
Gr6	Gr<4	0	82.83	87.43	89.66	94.92	-0.11	2.86	74.42	3.92	13.9	55	64.1	84.59	89.62	90.51	

	Flake	Blister	Color									Initial Results				
Scribe Rust	Blister	Overall Rust														
Lite	0	Gr>9	77.46	82	84.47	92.58	-0.57	2.53	70.24	3.45	9.3	40.8	51.9	81.42	86.74	86.25
Lite, sl. Uner cut	0	Gr>9	77.6	82.2	85.22	92.66	-0.68	2.14	72.24	2.81	9.8	42.1	50.3	80.11	85.38	86.99
Lite	6 few-med	Gr10	82.43	86.75	88.97	94.63	0.35	2.85	73.79	3.95	14.4	46.5	60.8	84.26	89.24	88.2
Lite	0	Gr10	82.85	87.19	89.35	94.82	0.37	2.91	73.89	4.03	12.1	41.8	56.1	84.3	89.36	87.51
Mod	0	Gr10	76.93	81.48	82.04	92.35	-0.66	3.92	63.21	5.67	11	45.8	54.3	79.83	84.68	87.92
Mod	0	Gr10	75.62	80.08	80.43	91.72	-0.63	4.05	61.1	5.92	10	43.6	52.2	79.95	84.82	88.42
Mod	0	Gr10	80.45	85.29	82.33	94.04	-0.8	6.58	55.1	9.57	16.1	56.7	73.7	84.01	89.24	88.45
Mod	0	Gr10	79.47	84.54	82.2	93.6	-0.96	5.96	56.85	8.68	18	61.2	72.7	83.61	88.78	89.36
Hvy	8 med dense	Gr2	67.74	70.54	64.28	87.26	1.91	9.44	24.75	15.14	2.5	4.8	4.4	82.87	87.76	86.6
Hvy	8 med dense	Gr2	69.55	72.45	66.89	88.19	1.86	8.78	30.21	14.02	2.2	4.1	4.4	82.32	87.15	86.34
Hvy	0	Gr10	76.69	81.15	82.37	92.2	-0.5	3.42	65.2	4.92	22.9	62.8	78.1	80	84.88	86.8
Hvy	0	Gr10	76.05	80.46	81.38	91.89	-0.48	3.64	63.47	5.27	23.2	64.3	73.6	80.12	84.99	87.01
Mod	8 med dense	Gr 8-2	74.37	78.53	77.21	91.02	-0.17	5.3	53.57	8.01	11.9	48.1	48.3	81.36	86.59	88
Mod	8 med dense	Gr 8-2 (T4.2)?	75.18	79.45	79.09	91.44	-0.31	4.58	57.97	6.84	12	46	51.1	81.11	86.31	87.83
Lite	0	Gr10	72.32	76.72	79.32	90.19	-0.88	2.25	65.99	3	8	34	46.7	75.71	80.58	83.4
Lite	0	Gr10	74.9	79.45	81.77	91.44	-0.86	2.56	67.43	3.43	22.4	62.2	70.3	77.94	82.95	85.36
Hvy	0	Gr>9	81.19	86.05	88.18	94.34	-0.77	2.9	72.78	3.89	21.8	61.6	55	82.64	88.13	86.77
Hvy	0	Gr>9	80.95	85.77	87.41	94.21	-0.72	3.24	70.93	4.44	26.1	67.9	61.2	82.28	87.74	86.51
Mod	0	Gr10	80.27	84.76	84.47	93.78	-0.17	4.61	63.62	6.62	65.8	90.6	83	84.57	89.5	90.71
Mod	0	Gr10	78.83	83.18	82.41	93.09	-0.07	4.93	60.41	7.18	45.4	77.8	67.6	84.11	88.97	88.97
None	0	Gr10	72.59	76.12	66.97	89.92	0.88	11.7	20.62	17.93	12	48.1	52.5	77.62	81.47	72.37
None	0	Gr10	70.5	74.1	65.83	88.97	0.54	11.04	21.19	17.11	9.4	40.7	38.4	75.88	80.03	72.46
Lite	0	Gr>9	54.98	57.29	42.83	80.34	1.68	18.86	-40.51	30.47	82.3	83.4	93.2	70.86	74.9	71.33
Lite	0	Gr>9	54.93	57.32	43.92	80.36	1.5	17.64	-34.28	28.74	82.3	83.4	93.2	70.69	74.65	71.09
V Lite-0	0	Gr10	77.38	81.68	82.59	92.44	-0.14	3.67	64.64	5.27	38.8	74.4	93.2	82.36	87.05	90.39
V Lite-0	0	Gr10	77.92	82.31	83.62	92.71	-0.23	3.38	66.63	4.79	38.8	83.4	93.2	82.06	86.78	90.25
Hvy	Sl. Undercutting 0	Gr9	83.57	87.94	88.49	95.13	0.37	4.06	69.57	5.82	68.3	84.1	95.1	86.39	91.91	88.04
Hvy	Sl. Undercutting 0	Gr9	83.8	80.26	88.95	95.27	0.23	3.97	70.32	5.66	70.9	89.8	95.5	86.25	91.74	88.38
Lite staining	0	Gr>9	42.99	45.02	37.13	72.91	0.27	12.88	-27.81	23.16	8.1	29.8	59.5	44.92	48.01	48.75
Lite staining	0	Gr>9	42.15	44.32	36.72	72.44	0.38	12.59	-27.25	22.82	11.2	29.3	58.4	44.76	47.94	47.73
V. Lite	0	Gr10	72.44	76.72	79.57	90.19	-0.62	2.07	66.9	2.79	79.8	93.2	93.2	78.05	82.75	88.56
V. Lite	0	Gr10	71.99	76.21	78.71	89.96	-0.56	2.32	65.18	3.21	79.8	93.1	93.2	77.82	82.46	88.28
Hvy	0	Rust Gr9	72.21	76.04	75.34	89.88	0.24	4.79	53.27	7.29	32.8	67.3	81.1	75.71	80.33	69.46
Hvy	0	Pitting Gr9	70.78	74.51	73.67	89.17	0.28	4.88	51.16	7.5	42	72.8	82.8	75.39	80.05	69.34
Lite-0	0	Gr10	84.96	90.08	93.78	96.03	-0.83	1.94	81.34	2.24	77.3	92.1	94.9	86.72	92.32	95.15

Lite-0	0	Gr10	82.85	87.82	91.26	95.08	-0.79	2.04	78.56	2.43	52.1	84.1	44.9	85.62	91.1	93.91
Lite-None	Gr>8 Med	Gr10	76.39	80.91	81.75	92.09	-0.66	3.71	63.61	5.27	66.3	88.3	90.9	81.66	86.66	89.13
Lite-None	Gr>8 Med	Gr10	76.69	81.25	82.24	92.24	-0.71	3.6	64.45	5.09	68.9	88	86.4	81.9	86.95	89.55
Hvy	0	Gr>9	82.41	87.41	90.77	94.94	-0.89	2.08	77.94	2.55	67.4	92.9	89.2	86.87	92.31	96.07
Hvy	0	Gr>9	82.38	87.39	90.63	94.9	-0.9	2.16	77.55	2.67	70.4	93	90.9	86.07	91.49	95.34

Delta Values																
L	A	B	CIE	YELLOW	20	60	85	X	Y	Z	L	A	B	CIE	YELLOW	
93.92	-1.54	13.58	22.65	19.58	13.2	46.1	-2.6	-0.07	0.23	-9.12	0.09	-0.54	7.21	-32.91	-10.41	
94.32	-1.2	10.4	38.36	15.07	11.1	44.8	9.8	0.77	0.9	-4.69	0.39	-0.16	4.2	-18.28	-6.18	
95.53	-0.29	3.67	72.3	5.13	0.2	2.1	3.7	6.8	7.46	9.39	3.21	-0.51	-1.27	13.82	2.24	
95.86	-0.19	4.08	71.3	5.74	0.2	2.4	4.2	7.87	8.58	10.26	3.69	-0.53	-1.08	14.23	2	
96.06	-0.46	3.44	74.67	4.66	0.2	2.5	0.1	6.92	7.57	7.4	3.23	-0.31	0.32	6.55	-0.28	
95.88	-0.64	2.93	76.49	3.9	0.2	2.1	0.3	6.71	7.33	8.07	3.13	-0.43	-0.33	9.2	0.69	
97.37	-1.24	3.64	77.13	4.83	10	12.3	3.4	2.45	2.68	1.33	1.1	-0.14	0.98	-1.58	-1.5	
97.4	-1.23	3.74	76.73	4.99	23.7	22.8	6.6	2.49	2.74	1.18	1.12	-0.16	1.12	-2.17	-1.72	
96.16	-1.8	7.07	58.46	9.96	7.6	35.8	15.2	2.07	2.99	-2.76	1.25	-1.45	4.11	-15.5	-5.95	
95.26	-1.91	6.5	58.67	9.2	7.7	33.3	13.8	3.45	4.42	-1.4	1.88	-1.39	4.26	-14.82	-6.26	
95.04	-1.17	3.82	70.33	5.18	23.3	53.4	33.5	2.31	2.93	0.34	1.25	-0.89	1.92	-5.72	-2.79	
95.17	-0.91	3.16	73.68	4.19	26	66.3	29.2	1.48	1.92	0.34	0.81	-0.66	1.17	-3.33	-1.67	
93.47	-0.62	3.18	69.39	4.5	1	7	2.4	3.67	3.98	3.69	1.76	-0.2	0.33	2.66	-0.5	
94.06	-0.75	3.37	69.96	4.76	1.7	9.3	1.4	3.67	4.07	-4.86	1.78	-0.35	0.35	2.69	-0.5	
93.43	0.61	6.19	55.5	9.25	0.4	2.7	0.2	4.84	5.16	5.74	2.3	-0.15	-0.43	7.76	0.93	
93.51	0.76	5.96	56.83	8.89	0.3	2.5	-0.6	5.21	5.48	6.31	2.42	0	-0.62	9.05	1.23	
92.38	1.47	10.08	34.9	15.32	1.3	14.4	14	7.17	7.94	7.54	3.64	-0.87	0.06	9.16	0.53	
92.08	1.37	10.18	33.6	15.51	1.4	15.8	16.3	6.71	7.39	6.2	3.4	-0.72	0.75	5.22	-0.56	
95.56	-0.72	3.71	72.17	5.11	4.9	23.7	16.3	4.93	5.08	6.88	2.17	0.27	-1.2	10.97	1.88	
96.4	-0.49	5.15	67.86	7.29	6.9	23.8	8	3.98	4.03	4.93	1.69	0.32	-0.1	7.14	0.9	
95.06	-0.78	4.16	68.87	5.78	15.7	45.3	13.9	0.12	0.48	-1.54	0.2	-0.64	1.43	-6.04	-2.07	
95.84	-0.72	3.86	72.2	5.29	11.9	42.4	8.6	1.76	2.19	0.85	0.92	-0.61	1	-2.22	-1.37	

					Delta Values															
94.63	-1.59	4.78	64.85	6.74	7.4	32.5	8.1	3.96	4.74	1.78	2.05	-1.02	2.25	-5.39	-3.29					
94.05	-1.65	3.26	70.39	4.4	7.9	35.6	15.8	2.51	3.18	1.77	1.39	-0.97	1.12	-1.85	-1.59					
95.68	-0.66	5.21	65.72	7.37	12	18.1	-13.8	1.83	2.49	-0.77	1.05	-1.01	2.36	-8.07	-3.42					
95.73	-0.8	5.78	63.24	8.23	9.9	18.2	-17.8	1.45	2.17	-1.84	0.91	-1.17	2.87	-10.65	-4.2					
93.75	-0.9	2.07	75.13	2.63	9	43	49	2.9	3.2	5.88	1.4	-0.24	-1.85	11.92	3.04					
93.81	-0.92	1.82	76.44	2.22	8.2	41.2	47	4.33	4.74	7.99	2.09	-0.29	-2.23	15.34	3.7					
95.68	-1.12	5.03	66.47	7.07	14.2	54	66	3.56	3.95	6.12	1.64	-0.32	-1.55	11.37	2.5					
95.49	-1.06	4.05	70.4	5.62	16.2	58.6	65.4	4.14	4.24	7.16	1.89	-0.1	-1.91	13.55	3.06					
95.06	-0.65	5.28	63.78	7.47	1	2.3	1.2	15.13	17.22	22.32	7.8	-2.56	-4.16	39.03	7.67					
94.8	-0.59	5.02	64.28	7.09	0.7	1.8	1.7	12.77	14.7	19.45	6.61	-2.45	-3.76	34.07	6.93					
93.83	-0.93	3.01	71.04	4.16	20.7	36.3	1.2	3.31	3.73	4.43	1.63	-0.43	-0.41	5.84	0.76					
93.88	-0.9	2.94	71.45	4.05	21.1	42.9	0.9	4.07	4.53	5.63	1.99	-0.42	-0.7	7.98	1.22					
94.56	-1.43	3.42	70.94	4.7	9.8	35.7	6.8	6.99	8.06	10.79	3.54	-1.26	-1.88	17.37	3.31					
94.44	-1.39	3.34	71.01	4.57	10.1	33.8	7.5	5.93	6.86	8.74	3	-1.08	-1.24	13.04	2.27					
91.95	-1.41	2.23	70.12	2.83	4.4	13.7	15.6	3.39	3.86	4.08	1.76	-0.53	-0.02	4.13	0.17					
92.99	-1.4	2.6	70.85	3.38	16.3	31.5	16.2	3.04	3.5	3.59	1.55	-0.54	0.04	3.42	0.05					
95.21	-1.75	5.42	63.44	7.62	18.9	28.1	1.5	1.45	2.08	-1.41	0.87	-0.98	2.52	-9.34	-3.73					
95.05	-1.74	5.33	63.46	7.5	22.8	34.8	7.7	1.33	1.97	-0.9	0.84	-1.02	2.09	-7.47	-3.06					
95.74	-0.55	3.64	73.08	4.98	53.6	47.9	4.2	4.3	4.74	6.24	1.96	-0.38	-0.97	9.46	1.64					
95.57	-0.46	4.47	68.79	6.26	37.9	39.2	6.3	5.28	5.79	6.56	2.48	-0.39	-0.46	8.38	0.92					
92.34	0.75	11.41	28.54	17.13	10.4	46	50.9	5.03	5.35	5.4	2.42	-0.13	-0.29	7.92	0.8					
91.7	0.01	10.23	32.2	15.35	7.8	38.7	37.2	5.38	5.93	6.63	2.73	-0.53	-0.81	11.01	1.76					
89.35	-0.34	7.09	40.97	11.05	81.1	81.6	91.6	15.88	17.61	28.5	9.01	-2.02	-11.77	81.48	19.42					
89.23	-0.17	7.08	40.76	11.06	80.9	81.2	91.6	15.76	17.33	27.17	8.87	-1.67	-10.56	75.04	17.68					
94.76	-0.32	2.08	77.59	2.63	27.4	26.5	8.6	4.98	5.37	7.8	2.32	-0.18	-1.59	12.95	2.64					
94.65	-0.36	1.99	77.74	2.49	25.4	33.8	7.4	4.14	4.47	6.63	1.94	-0.13	-1.39	11.11	2.3					
96.79	-1.41	7.22	59.52	10.2	65.4	55.9	9.7	2.82	3.97	-0.45	1.66	-1.78	3.16	-10.05	-4.38					
96.72	-1.37	6.86	60.95	9.69	68.4	68.6	18.7	2.45	11.48	-0.57	1.45	-1.6	2.89	-9.37	-4.03					
74.83	-1.72	2.85	32.08	4.79	7.2	28.5	58.7	1.93	2.99	11.62	1.92	-1.99	-10.03	59.89	18.37					
74.79	-2.01	3.86	26.36	6.58	10.3	28	57.7	2.61	3.62	11.01	2.35	-2.39	-8.73	53.61	16.24					
92.9	-0.81	0.17	81.94	-0.32	76.1	57.9	8	5.61	6.03	8.99	2.71	-0.19	-1.9	15.04	3.11					
92.78	-0.71	0.14	81.79	-0.42	76.8	62.5	18.7	5.83	6.25	9.57	2.82	-0.15	-2.18	16.61	3.63					
91.83	-0.93	12.91	19.9	19.14	24.2	20.4	15.9	3.5	4.29	-5.88	1.95	-1.17	8.12	-33.37	-11.85					
91.71	-1.04	12.8	20.04	18.99	33.4	26.9	17.4	4.61	5.54	-4.33	2.54	-1.32	7.92	-31.12	-11.49					
96.95	-1.5	2.6	80.66	3.16	32.4	15.8	1.6	1.76	2.24	1.37	0.92	-0.67	0.66	-0.68	-0.92					

96.45	-1.41	2.58	79.5	3.15	15	9.9	-33.9	2.77	3.28	2.65	1.37	-0.62	0.54	0.94	-0.72
94.59	-0.98	2.68	74.4	3.5	42.6	18.9	7.5	5.27	5.75	7.38	2.5	-0.32	-1.03	10.79	1.77
94.72	-1.04	2.6	75.09	3.36	47.6	24.5	3.1	5.21	5.7	7.31	2.48	-0.33	-1	10.64	1.73
96.95	-1.22	1.97	83.45	2.29	63.5	54.5	11.3	4.46	4.9	5.3	2.01	-0.33	-0.11	5.51	0.26
96.61	-1.24	1.88	83.01	2.15	66.8	60.4	12.6	3.69	4.1	4.71	1.71	-0.34	-0.28	5.46	0.52

Table B-3
NTS Outdoor Exposure Initial and Final Test Results - El Segundo

Product	SRD	SRN (Filename)	Resin Type	System VOC	Average VOC of Coating	24 Month Results					
						Gloss			Chalk	Crack	Flake
Wood Coatings						20	60	85	None		
109-110-1	QDS-03	W02 Y05 T650	Alkyd	850	425	1.9	11.3	31.5	None	Gr8	Gr 6-4
109-110-3	QDS-03	W02 Y05 T650	Alkyd	850	425	1.9	10.6	32.4	None	Gr8	Gr 6-4
331-237-6	NFS-15	W02 Y21 T650	Acrylic	500	250	1.6	7.1	22.7	None	0	0
331-237-8	NFS-15	W02 Y21 T650	Acrylic	500	250	1.6	6.9	22.3	None	0 surface damage	0
334-203-6	NFS-21	W02 Y09 T650	Acrylic	0	0	1.6	2.6	4.5	None	0	0
334-203-8	NFS-21	W02 Y09 T650	Acrylic	0	0	1.6	2.5	5.1	None	0	0
301-201-1	NFS-01	W02 Y07 T650	Copolymer Latex/Acrylic Latex	1	0.5	2	9.8	34.5	None	small end, side, few >8	0
301-201-3	NFS-01	W02 Y07 T650	Copolymer Latex/Acrylic Latex	1	0.5	1.9	10.9	28.9	None	small end, side, few >8	0
328-213-1	NFS-12	W02 Y18 T650	Alkyd/Acrylic	597	298.5	1.8	6.3	11.7	None	0	0
328-213-3	NFS-12	W02 Y18 T650	Alkyd/Acrylic	597	298.5	1.8	5.6	12.3	None	0	0
101-102-6	QDS-01	W02 Y01 T650	Alkyd/Alkyd	840	420	1.9	15.2	54.3	None	Gr 4-2	Gr2 (Edge)
101-102-8	QDS-01	W02 Y01 T650	Alkyd/Alkyd	840	420	2	17.5	55.6	None	Gr 4-2	Gr2 (Edge)
111-111-112-6	QDS-04	W02 Y06 T650	Alkyd/Alkyd	1200	400	1.6	5.2	19.4	None	Gr2	Gr4
111-111-112-8	QDS-04	W02 Y06 T650	Alkyd/Alkyd	1200	400	1.6	5.2	21.6	None	Gr4	Gr4
332-217-6	NFS-18	W02 Y24 T650	Acrylic	500	250	3.5	36.6	62.4	None	0	0
332-217-8	NFS-18	W02 Y24 T650	Acrylic	500	250	4.2	32.5	65.3	None	0	0
325-210-1	NFS-09	W02 Y15 T650	Acrylic	0	0	1.6	3.6	6.8	>>8	0	0
325-210-3	NFS-09	W02 Y15 T650	Acrylic	0	0	1.7	3.6	6.5	>>8	0	0
322-206-1	NFS-05	W02 Y11 T650	Acrylic	250	125	2	9.6	12.7	None	0	0
322-206-3	NFS-05	W02 Y11 T650	Acrylic	250	125	2.1	11.1	12.7	None	0	0
111-218-3	QDNFS-01	W02 Y47 T650	Alkyd/Alkyd	570	285	1.7	2.8	33.9	None	Sl. Edge Cracks >8	0
111-218-5	QDNFS-01	W02 Y47 T650	Alkyd/Alkyd	570	285	1.7	3.2	33.8	None	Sl. Edge Cracks >8	0

Product	SRD	SRN (Filename)	Resin Type	System VOC	Average VOC of Coating	24 Month Results					
						Gloss			Chalk	Crack	Flake
Industrial Maintenance						20	60	85	None		
932-932-3	IMCS-18	S01 Y43 T660	Epoxy	568	284	1.8	2.5	10.2	Gr>8	Mod Sl. Spread	0
932-932-5	IMCS-18	S01 Y43 T660	Epoxy	568	284	1.8	2.5	8.5	Gr>8	Mod No Spread	0
910-911-5	IMCS-06	S01 Y30 T660	Epoxy/Urethane	0	0	12.8	45.3	75.7	None	Fili Form Med A	0
910-911-6	IMCS-06	S01 Y30 T660	Epoxy/Urethane	0	0	7	35.2	76.4	None	Fili Form Med A	0
920-921-5	IMCS-12	S01 Y37 T660	Epoxy/Siloxane	408	204	19.5	58.5	91.4	None	Lite No Spread	0
920-921-6	IMCS-12	S01 Y37 T660	Epoxy/Siloxane	408	204	16.6	54.6	85.8	None	Lite No Spread	0
914-916-916-5	IMCS-09	S01 Y34 T660	Butadiene-Epoxy/Epoxy	0	0	6.5	37.5	56	None	Hvy Filiform	Gr8 Medium
914-916-916-6	IMCS-09	S01 Y34 T660	Butadiene-Epoxy/Epoxy	0	0	6.2	35.6	52.3	None	Scribe Rust Med A	Gr8 Medium
902-010-3	IMCS-20	S01 Y48 T660	Epoxy Ester/Urethane	820	410	2	6.9	66.4	None	Filiform Few A	0
902-010-4	IMCS-20	S01 Y48 T660	Epoxy Ester/Urethane	820	410	2.4	9.4	73.9	None	Filiform Few A	0
933-932-934-4	IMCS-19	S01 Y44 T660	Zinc/Epoxy/Urethane	954	318	3.3	27.5	76.4	None	Filiform Few A	0
933-932-934-6	IMCS-19	S01 Y44 T660	Zinc/Epoxy/Urethane	954	318	3.6	25.6	86.2	None	Filiform Few A	0
914-915-915-3	IMCS-08	S01 Y33 T666	Butadiene-Epoxy/Urethane	0	0	2.1	7.1	10.2	None	Mod-Sl.	0
914-915-915-7	IMCS-08	S01 Y33 T666	Butadiene-Epoxy/Urethane	0	0	4.4	25.8	52.6	None	Staining	0
902-903-3	IMCS-02	S01 Y27 T660	Epoxy Ester/Silicone	820	410	3.6	36.6	64.9	None	Hvy-Filiform FewA	0
902-903-4	IMCS-02	S01 Y27 T660	Epoxy Ester/Silicone	820	410	3.7	42.2	67.6	None	Hvy-Filiform FewA	0
930-931-3	IMCS-17	S01 Y42 T660	Alkyd/Alkyd	804	402	1.8	10.5	39.8	Gr>>8	Hvy	0
930-931-4	IMCS-17	S01 Y42 T660	Alkyd/Alkyd	804	402	1.8	8.7	37.8	Gr>>8	Hvy-Staining	0
901-901-4	IMCS-01	S01 Y28 T660	Siloixane	216	108	1.2	1.8	1.4	Gr8	None	0
901-901-6	IMCS-01	S01 Y28 T660	Siloixane	216	108	1.1	1.8	1	Gr8	None	0
906-907-907-4	IMCS-04	S01 Y29 T660	Acrylic/Acrylic	554	184.6666667	3.8	36.2	72.4	None	Mod-Lite	0
906-907-907-5	IMCS-04	S01 Y29 T660	Acrylic/Acrylic	554	184.6666667	3.6	34.4	67.8	None	Mod-spread	0
927-928-929-3	IMCS-16	S01 Y41 T660	Epoxy/Epoxy/Urethane	890	296.6666667	7.5	36.2	82	None	Mod-V Sl Spread	0
927-928-929-4	IMCS-16	S01 Y41 T660	Epoxy/Epoxy/Urethane	890	296.6666667	6.8	38.2	67.8	None	Mod-V Sl Spread	0
917-918-3	IMCS-10	S01 Y35 T660	Alkyd/Urethane Alkyd	828	414	6	47.7	85.2	None	Mod Hvy Sl Spread	0
917-918-5	IMCS-10	S01 Y35 T660	Alkyd/Urethane Alkyd	828	414	7.5	47.9	89.8	None	Mod Hvy	0
912-913-913-4	IMCS-07	S01 Y32 T666	Novolac	0	0	0.8	1.2	0.9	Gr8	O-Lite	0
912-913-913-5	IMCS-07	S01 Y32 T666	Novolac	0	0	0.8	1.2	0.6	Gr8	O-Lite	0
923-924-3	IMCS-14	S01 Y39 T660	Alkyd/Alkyd	805	402	3.6	32.5	72.8	None	Hvy-Filiform FewA	8 Med
923-924-4	IMCS-14	S01 Y39 T660	Alkyd/Alkyd	805	402	3.6	34.2	72.6	None	Hvy-Med A	0
925-925-3	IMCS-15	S01 Y40 T660	Epoxy	790	395	1.7	2.4	4.7	Gr8	Hvy with Staining	0
925-925-4	IMCS-15	S01 Y40 T660	Epoxy	790	395	1.7	2.4	3.6	Gr8	Hvy with Staining	0
919-919-5	IMCS-11	S01 Y36 T660	Epoxy	340	170	1.5	2	2.6	Gr8	Med-Staining	0
919-919-6	IMCS-11	S01 Y36 T660	Epoxy	340	170	1.5	2	1.8	Gr8	Med-Staining	0
922-922-2	IMCS-13	S01 Y38 T660	Acrylic	462	231	0.7	2.1	3	Gr>8	Fully Hvy-Pitting	8
922-922-4	IMCS-13	S01 Y38 T660	Acrylic	462	231	0.9	1.9	3.2	Gr>8	Rusted Scribe Surfacerust	8
908-909-5	IMCS-05	S01 Y31 T660	Acrylic/Acrylic	180	90	2	14.5	46.3	None	Mod-Filiform Few A	0
908-909-6	IMCS-05	S01 Y31 T660	Acrylic/Acrylic	180	90	2	19.1	52.8	None	Mod-Filiform Few A	0
904-905-905-3	IMCS-03	S01 Y28 T660	Zinc/Urethane	159	49.66666667	6.5	39.5	80.6	None	Hvy	8 Med Dense
904-905-905-4	IMCS-03	S01 Y28 T660	Zinc/Urethane	159	49.66666667	3.9	24.2	59.2	None	Hvy	8 Med Dense

Blister	Color	Initial Results														
		X	Y	Z	L	A	B	CIE	YELLOW	Gloss	20	60	85	X	Color	
		X	Y	Z	L	A	B	CIE	YELLOW	Gloss	20	60	85	X	Y	Z
Few	80.74	85.14	86.19	93.94	0.03	3.65	68.44	5.2	15.4	57.7	61.9	85.56	90.69	90.09		
Few	79.73	84.15	85.82	93.51	-0.1	3.18	69.55	4.47	13.4	54.8	56.8	84.29	89.33	89.49		
0	65.85	68.55	63.56	86.28	1.94	8.38	27.51	13.61	3.2	21.8	40.5	78.39	81.76	74.12		
0	65.45	68.1	62.28	86.06	2	9.13	23.3	14.83	3.3	21.9	41.3	76.74	80.04	72.46		
0	70.95	74.45	71.46	89.14	0.77	6.61	42.84	10.36	2	5.1	6.1	80.09	84.12	81.5		
0	68.47	71.8	68.59	87.87	0.88	6.8	38.89	10.8	2	5.2	6.1	79.22	83.12	80.25		
0	78.38	83.05	80.3	93.04	-0.72	6.42	53.34	9.36	8.1	44.4	54.2	85.56	90.58	90.38		
0	75.81	80.42	79.29	91.87	-0.89	5.18	56.18	7.53	5.7	34.5	41.5	83.57	88.56	89.66		
0	76.32	80.74	83.43	92.01	-0.46	2.33	69.87	3.14	3.3	17.8	17.3	80.06	84.75	86.92		
0	76.22	80.58	82.83	91.95	-0.38	2.65	68.21	3.66	3.5	20.1	19.6	79.88	84.58	85.47		
6 Med	78.27	82.7	83.73	92.88	-0.28	3.61	66	5.13	30	73.6	83.7	83.35	88.36	90.02		
6 Med	79.25	83.74	86.61	93.34	-0.28	2.3	73.14	3.02	35.7	79.5	81.3	83.05	87.98	90.26		
0	71.98	75.98	76.03	89.85	-0.11	4.2	56	6.3	7.4	38.3	57.9	85.54	91.01	89.28		
0	78.07	82.48	83.76	92.79	-0.27	3.42	66.65	4.85	9.7	45.9	55.4	84.48	89.87	88.61		
0	82.73	87.77	89.33	95.06	-0.92	3.35	72.53	4.49	23.6	73.9	76	87.62	93.06	94.56		
0	83.17	88.25	89.87	95.27	-0.96	3.32	73.17	4.42	27.6	74.8	79.9	87.68	93.08	94.96		
0	68.28	71.9	70.86	87.92	0.25	5.01	47.65	7.76	2.1	6.3	7.2	84.68	89.55	91.75		
0	72.3	76.22	76.28	89.96	0.09	4.2	56.28	6.27	2.1	6.4	7.4	84.19	89.06	91.2		
0	67.13	70.66	69.56	87.32	0.32	5.04	46.11	7.92	2.1	6.7	15	84.26	88.91	89.94		
0	66.69	70.16	68.66	87.08	0.37	5.38	43.93	8.49	2.1	6.2	13.9	84.64	89.37	90.48		
0	72.21	76.52	72.97	90.1	-0.71	7.05	42.96	10.63	21.4	62.3	90.8	80.6	85.74	78.22		
0	73.04	77.4	73.64	90.51	-0.71	7.22	42.16	10.84	19.2	62.6	76.3	80.55	85.68	76.35		

										Initial Results							
Blister	Color	X	Y	Z	L	A	B	CIE	YELLOW	Gloss	20	60	85	Color	X	Y	Z
		X	Y	Z	L	A	B	CIE	YELLOW	Gloss	20	60	85	Color	X	Y	Z
Gr9	74.68	79.18	74.42	91.31	-0.8	7.99	41.58	11.96	17.9	60.4	69.8	83.39	88.52	89.4			
Gr9	76.35	80.91	76.07	92.09	-0.74	8.03	43.39	11.94	18.1	60.7	71.6	83.42	88.51	88.84			
10	76.79	80.98	79.56	92.12	0.03	5.4	55.81	7.99	56.6	84	89.2	83.83	88.69	88.82			
Edge Rust	76.56	80.86	80.29	92.07	0.21	4.76	58.66	6.97	56.8	87.1	92.7	82.89	87.78	89.4			
10	85.34	90.54	93.89	96.22	-0.94	2.19	80.67	2.6	79.6	91.5	93.4	86.59	92.2	94.23			
10	83.52	88.61	91.57	95.42	-0.93	2.4	77.73	2.95	73.3	91	91.3	86.21	91.88	93.41			
10	72.57	76.49	75.79	90.09	0.1	4.8	53.73	7.26	33.6	66.2	79.3	76.26	80.95	69.94			
10	72.64	76.55	75.64	90.11	0.14	4.96	53.02	7.5	36.6	71.7	85	75.79	80.32	68.75			
Gr9 Edge rust	80.05	84.74	86.81	93.77	-0.58	2.91	71.37	3.93	73.1	91.8	88.9	87.87	93.31	96.47			
Gr9	79.92	84.64	86.69	93.73	-0.64	2.92	71.22	3.94	68.7	94.4	87.1	86.93	92.32	95.89			
Gr10	72.2	76.41	79.28	90.05	-0.5	2.04	66.72	2.73	68	82.9	84.5	78.06	82.71	88.5			
Gr10	73.26	77.55	80.95	90.57	-0.55	1.68	69.59	2.13	77	91.8	94.9	78.21	82.85	88.24			
Gr10	71.95	76.3	76.22	90	-0.83	4.31	55.76	6.32	4.6	18.5	21.2	79.85	84.91	85.43			
Gr10	73.19	77.69	78.09	90.64	-0.98	3.97	58.89	5.72	22.2	64	76	79.1	84.12	86.51			
Gr9 Edge rust	80.44	85.29	87.31	94.01	-0.82	2.95	71.73	3.99	30.1	72.2	69	82.76	88.1	87.34			
Gr9 Edge rust	79.96	84.77	86.97	93.78	-0.8	2.81	71.84	3.77	38.4	78.3	75.4	82.34	87.74	86.87			
Gr10	74.44	78.88	80.27	91.18	-0.71	3.23	63.66	4.59	11.1	44.6	50.8	80.67	85.87	86.62			
Gr9	74.73	79.22	81	91.33	-0.76	2.95	65.33	4.13	10.2	42.7	82.2	81.23	86.53	86.25			
Gr10	50.55	52.24	38.1	77.42	2.75	19.46	-51.4	32.3	68	89.6	89	69.81	73.87	71.1			
Gr10	50.56	52.53	40.47	77.6	2.02	16.87	-37.49	28.42	32.2	82.9	68.6	68.48	72.63	71.14			
Gr10	73.25	77.56	78.15	90.58	-0.59	3.82	59.49	5.61	18.4	59.7	69.6	79.93	84.8	86.91			
Gr10	75.26	79.7	80.56	91.55	-0.61	3.65	62.56	5.28	17.2	57.7	60.4	79.81	84.65	87.01			
Gr10	77.22	81.55	83.13	92.37	-0.19	3.16	66.84	4.45	41.8	80.4	90.7	82.19	86.84	90.28			
Gr10	77.71	82.06	83.69	92.6	-0.17	3.14	67.5	4.41	42.6	79.8	87.6	82.19	86.83	90.23			
Gr10	81.05	85.44	85.1	94.07	0.1	4.65	64.16	6.75	65.4	87.1	87.5	85.85	91.39	88.2			
Gr10	81.64	86	85.65	94.31	0.21	4.67	64.69	6.76	71.8	89.4	95.5	86.26	91.73	87.42			
10	38.66	40.38	31.95	69.74	1.21	14.28	-43.02	26.38	11.3	34	65.6	45.1	48.13	49.04			
10	38.93	40.7	32.3	69.97	1.07	14.18	-41.95	26.13	10.2	35	68.3	44.88	47.91	48.96			
10	80.01	84.3	85.77	93.58	0.17	3.32	69.04	4.7	11.9	42	60	84.02	89.03	87.02			
10	79.67	83.88	84.98	93.4	0.29	3.58	67.44	5.12	13.2	43.2	64.9	84.45	89.42	87.1			
Gr9	73.62	77.88	76.89	90.72	-0.44	5.04	54.05	7.56	10.3	45.9	56.5	80.33	85.15	88.47			
Gr9	73.05	77.29	76.25	90.46	-0.49	5.08	53.24	7.63	10.1	44.4	52.6	80.08	84.93	88.42			
Gr10	64.75	67.53	56.97	85.77	1.65	13.52	0.96	21.4	12.8	50.3	53.9	77.78	81.64	72.96			
Gr10	65.26	68.07	58.33	86.04	1.63	12.71	5.64	20.16	13.5	50.5	50.8	76.24	80.21	72.36			
Gr1	53.37	53.66	36.15	78.26	6.54	23.36	-67.89	37.94	1.9	3.6	4	81.02	85.87	85.4			
Gr1	58.15	59.69	46.48	81.67	3.81	17.08	-27.23	27.9	2.1	4	4.4	82.62	87.39	86.28			
Gr8	71.96	76.13	74.95	89.92	-0.46	5.17	51.51	7.82	16.5	57.2	59.6	82.03	87.26	89.05			
Gr8	72	76.08	74.4	89.89	-0.26	5.56	49.61	8.47	18.6	61.2	68.1	81.49	86.64	87.88			
Gr8	76.93	81.53	82.29	92.37	-0.76	3.78	63.92	5.36	72.2	86.3	87.8	81.43	86.39	88.7			
Gr8	75.9	80.47	81.02	91.89	-0.79	3.91	62.18	5.59	57.1	82.6	76.6	81.6	86.56	88.91			

Delta Values over 24 months																	
					Gloss												
L	A	B	CIE	YELLOW	20	60	85	X	Y	Z	L	A	B	CIE	YELLOW		
96.28	-0.79	4.92	68.57	6.82	13.5	46.4	30.4	4.82	5.55	3.9	2.34	-0.82	1.27	0.13	-1.62		
95.72	-0.76	4.36	69.62	6.03	11.5	44.2	24.4	4.56	5.18	3.67	2.21	-0.66	1.18	0.07	-1.56		
92.47	1.75	10.22	34.52	15.53	1.6	14.7	17.8	12.54	13.21	10.56	6.19	-0.19	1.84	7.01	-1.92		
91.7	1.73	10.23	32.42	15.65	1.7	15	19	11.29	11.94	10.18	5.64	-0.27	1.1	9.12	-0.82		
93.5	0.66	6.32	55.1	9.43	0.4	2.5	1.6	9.14	9.67	10.04	4.36	-0.11	-0.29	12.26	0.93		
93.07	0.82	6.51	53.12	9.78	0.4	2.7	1	10.75	11.32	11.66	5.2	-0.06	-0.29	14.23	1.02		
96.24	-0.6	4.64	69.74	6.48	6.1	34.6	19.7	7.18	7.53	10.08	3.2	0.12	-1.78	16.4	2.88		
95.4	-0.75	3.69	71.85	5.06	3.8	23.6	12.6	7.76	8.14	10.37	3.53	0.14	-1.49	15.67	2.47		
93.78	-0.57	2.83	71.73	3.91	1.5	11.5	5.6	3.74	4.01	3.49	1.77	-0.11	0.5	1.86	-0.77		
93.7	-0.61	3.75	67.34	5.36	1.7	14.5	7.3	3.66	4	2.64	1.75	-0.23	1.1	-0.87	-1.7		
95.31	-0.82	3.3	73.41	4.38	28.1	58.4	29.4	5.08	5.66	6.29	2.43	-0.54	-0.31	7.41	0.75		
95.15	-0.68	2.85	75.06	3.71	33.7	62	25.7	3.8	4.24	3.65	1.81	-0.4	0.55	1.92	-0.69		
96.41	-1.4	5.71	65.32	7.96	5.8	33.1	38.5	13.56	15.03	13.25	6.56	-1.29	1.51	9.32	-1.66		
95.94	-1.37	5.37	65.61	7.49	8.1	40.7	33.8	6.41	7.39	4.85	3.15	-1.1	1.95	-1.04	-2.64		
97.25	-1.12	3.52	77.37	4.66	20.1	37.3	13.6	4.89	5.29	5.23	2.19	-0.2	0.17	4.84	-0.17		
97.26	-1.05	3.27	78.51	4.28	23.4	42.3	14.6	4.51	4.83	5.09	1.99	-0.09	-0.05	5.34	0.14		
95.81	-0.42	2.95	76.26	3.92	0.5	2.7	0.4	16.4	17.65	20.89	7.89	-0.67	-2.06	28.61	3.84		
95.61	-0.48	2.98	75.6	3.99	0.4	2.8	0.9	11.89	12.84	14.92	5.65	-0.57	-1.22	19.32	2.28		
95.54	-0.07	3.75	72	5.25	0.1	-2.9	2.3	17.13	18.25	20.38	8.22	-0.39	-1.29	25.89	2.67		
95.74	-0.17	3.7	72.68	5.16	0	-4.9	1.2	17.95	19.21	21.82	8.66	-0.54	-1.68	28.75	3.33		
94.2	-1.35	10.1	39.83	14.48	19.7	59.5	56.9	8.39	9.22	5.25	4.1	-0.64	3.05	-3.13	-3.85		
94.18	-1.34	11.41	33.34	16.51	17.5	59.4	42.5	7.51	8.28	2.71	3.67	-0.63	4.19	-8.82	-5.67		

Delta Values over 24 months																		
L	A	B	CIE	YELLOW	Gloss				X	Y	Z	L	A	B	CIE	YELLOW		
					20	60	85											
95.38	-1.02	3.85	71.07	5.3	16.1	57.9	59.6	8.71	9.34	14.98	4.07	-0.22	-4.14	29.49	6.66			
95.37	-0.95	4.22	69.35	5.89	16.3	58.2	63.1	7.07	7.6	12.77	3.28	-0.21	-3.81	25.96	6.05			
95.45	-0.48	4.37	68.93	6.11	43.8	38.7	13.5	7.04	7.71	9.26	3.33	-0.51	-1.03	13.12	1.88			
95.07	-0.65	3.31	72.75	4.49	49.8	51.9	16.3	6.33	6.92	9.11	3	-0.86	-1.45	14.09	2.48			
96.9	-1.54	3.14	78.12	3.99	60.1	33	2	1.25	1.66	0.34	0.68	-0.6	0.95	-2.55	-1.39			
96.77	-1.68	3.47	76.3	4.46	56.7	36.4	5.5	2.69	3.27	1.84	1.35	-0.75	1.07	-1.43	-1.51			
92.11	-0.99	12.99	20.32	19.18	27.1	28.7	23.3	3.69	4.46	-5.85	2.02	-1.09	8.19	-33.41	-11.92			
91.83	-0.74	13.49	17.19	19.95	30.4	36.1	32.7	3.15	3.77	-6.89	1.72	-0.88	8.53	-35.83	-12.45			
97.35	-1.1	2.41	82.56	2.95	71.1	84.9	22.5	7.82	8.57	9.66	3.58	-0.52	-0.5	11.19	0.98			
96.95	-1.11	2.11	82.89	2.49	66.3	85	13.2	7.01	7.68	9.2	3.22	-0.47	-0.81	11.67	1.45			
92.89	-0.7	0.18	81.87	-0.37	64.7	55.4	8.1	5.86	6.3	9.22	2.84	-0.2	-1.86	15.15	3.1			
92.95	-0.69	0.12	82.28	-0.46	73.4	66.2	8.7	4.95	5.3	7.29	2.38	-0.14	-1.56	12.69	2.59			
93.84	-1.28	4.02	66.4	5.55	2.5	11.4	11	7.9	8.61	9.21	3.84	-0.45	-0.29	10.64	0.77			
93.5	-1.28	2.65	71.86	3.43	17.8	38.2	23.4	5.91	6.43	8.42	2.86	-0.3	-1.32	12.97	2.29			
95.2	-1.49	5	65.36	7	26.5	35.6	4.1	2.32	2.81	0.03	1.19	-0.67	2.05	-6.37	-3.01			
95.05	-1.62	5.07	64.65	7.1	34.7	36.1	7.8	2.38	2.97	-0.1	1.27	-0.82	2.26	-7.19	-3.33			
94.26	-1.45	3.88	68.07	5.37	9.3	34.1	11	6.23	6.99	6.35	3.08	-0.74	0.65	4.41	-0.78			
94.54	-1.58	4.63	65.32	6.5	8.4	34	44.4	6.5	7.31	5.25	3.21	-0.82	1.68	-0.01	-2.37			
88.86	-0.49	6.44	42.88	10.05	66.8	87.8	87.6	19.26	21.63	33	11.44	-3.24	-13.02	94.28	22.25			
88.27	-0.82	5.38	46.55	8.38	31.1	81.1	67.6	17.92	20.1	30.67	10.67	-2.84	-11.49	84.04	20.04			
93.8	-0.91	2.88	71.56	3.93	14.6	23.5	-2.8	6.68	7.24	8.76	3.22	-0.32	-0.94	12.07	1.68			
93.73	-0.88	2.69	72.26	3.64	13.6	23.3	-7.4	4.55	4.95	6.45	2.18	-0.27	-0.96	9.7	1.64			
94.67	-0.28	2	77.72	2.51	34.3	44.2	8.7	4.97	5.29	7.15	2.3	-0.09	-1.16	10.88	1.94			
94.67	-0.26	2.03	77.57	2.55	35.8	41.6	19.8	4.48	4.77	6.54	2.07	-0.09	-1.11	10.07	1.86			
96.57	-1.49	6.74	61.09	9.5	59.4	39.4	2.3	4.8	5.95	3.1	2.5	-1.59	2.09	-3.07	-2.75			
96.71	-1.34	7.54	57.9	10.67	64.3	41.5	5.7	4.62	5.73	1.77	2.4	-1.55	2.87	-6.79	-3.91			
74.91	-1.54	2.68	33.18	4.47	10.5	32.8	64.7	6.44	7.75	17.09	5.17	-2.75	-11.6	76.2	21.91			
74.77	-1.58	2.53	33.76	4.19	9.4	33.8	67.7	5.95	7.21	16.66	4.8	-2.65	-11.65	75.71	21.94			
95.59	-0.75	5.9	62.36	8.39	8.3	9.5	-12.8	4.01	4.73	1.25	2.01	-0.92	2.58	-6.68	-3.69			
95.75	-0.61	6.12	61.79	8.72	9.6	9	-7.7	4.78	5.54	2.12	2.35	-0.9	2.54	-5.65	-3.6			
93.95	-0.79	2.03	75.83	2.55	8.6	43.5	51.8	6.71	7.27	11.58	3.23	-0.35	-3.01	21.78	5.01			
93.85	-0.86	1.9	76.2	2.34	8.4	42	49	7.03	7.64	12.17	3.39	-0.37	-3.18	22.96	5.29			
92.42	0.74	11.06	30.37	16.6	11.3	48.3	51.3	13.03	14.11	15.99	6.65	-0.91	-2.46	29.41	4.8			
91.78	0.38	10.45	31.45	15.69	12	48.5	49	10.98	12.14	14.03	5.74	-1.25	-2.26	25.81	4.47			
94.26	-0.78	4.76	64.09	6.7	1.2	1.5	1	27.65	32.21	49.25	16	-7.32	-18.6	131.98	31.24			
94.9	-0.44	5.23	63.59	7.42	1.2	2.1	1.2	24.47	27.7	39.8	13.23	-4.25	-11.85	90.82	20.48			
94.85	-1.36	3.17	72.79	4.28	14.5	42.7	13.3	10.07	11.13	14.1	4.93	-0.9	-2	21.28	3.54			
94.59	-1.28	3.55	70.4	4.9	16.6	42.1	15.3	9.49	10.56	13.48	4.7	-1.02	-2.01	20.79	3.57			
94.48	-0.92	2.78	73.66	3.67	65.7	46.8	7.2	4.5	4.86	6.41	2.11	-0.16	-1	9.74	1.69			
94.55	-0.89	2.75	73.98	3.61	53.2	58.4	17.4	5.7	6.09	7.89	2.66	-0.1	-1.16	11.8	1.98			

Table B-4

NTS Field Study - 12, 18 and 24 Month TAC Ratings - Saugus

SRD	12 Month Pictures SRN (Filename)	24 Month Pictures SRN (Filename)	NTS Number	Resin Type	System VOC	Primer VOC	Topcoat VOC	Substrate	12 Month Rating (1=best, 5=worst)	18 Month Rating (1=best, 5=worst)	24 Month Rating (1=best, 5=worst)
IMCS-01	901-901-2	901-901-2	S01 Y28 T660	Siloirxane	216	108	108	M	5	NA*	5
IMCS-01	901-901-3	901-901-3			216			M	5	NA*	5
IMCS-02	902-903-6	902-903-6	S01 Y27 T660	Epoxy Ester/Silicone	820	400	420	M	3	2.5	2
IMCS-02	902-903-7	902-903-7			820			M	3	2.5	2
IMCS-03	904-905-905-6	904-905-905-6	S01 Y28 T660	Zinc/Urethane	159	49	55/55	M	1	1	2
IMCS-03	904-905-905-7	904-905-905-7			159			M	1	1	2
IMCS-04	906-907-907-6	906-907-907-6	S01 Y29 T660	Acrylic/Acrylic	554	138	208/208	M	3	2	3
IMCS-04	906-907-907-7	906-907-907-7			554			M	3	2	3
IMCS-05	908-909-2	908-909-2	S01 Y31 T660	Acrylic/Acrylic	180	60	120	M	4	4	5
IMCS-05	908-909-3	908-909-3			180			M	4	4	5
IMCS-06	910-911-2	910-911-2	S01 Y30 T660	Epoxy/Urethane	0	0	0	M	2.5	3	2
IMCS-06	910-911-3	910-911-3			0			M	2.5	3	2
IMCS-07	912-913-913-2	912-913-913-2	S01 Y32 T666	Novolac	0	0	0	M	5	NA*	5
IMCS-07	912-913-913-3	912-913-913-3			0			M	5	NA*	5
IMCS-08	914-915-915-4	914-915-915-4	S01 Y33 T666	Butadiene-Epoxy/Urethane	0	0	0	M	2.5	3	2
IMCS-08	914-915-915-5	914-915-915-5			0			M	2.5	3	2
IMCS-09	914-916-916-2	914-916-916-2	S01 Y34 T660	Butadiene-Epoxy/Epoxy	0	0	0	M	4	4	4
IMCS-09	914-916-916-3	914-916-916-3			0			M	4	4	4
IMCS-10	917-918-2	917-918-2	S01 Y35 T660	Alkyd/Urethane Alkyd	828	417	411	M	3	2	4
IMCS-10	917-918-3	917-918-3			828			M	3	2	4
IMCS-11	919-919-2	919-919-2	S01 Y36 T660	Epoxy	340	170	170	M	4	2	5
IMCS-11	919-919-3	919-919-3			340			M	4	2	5
IMCS-12	920-921-2	920-921-2	S01 Y37 T660	Epoxy/Siloxane	408	288	120	M	1	1	2
IMCS-12	920-921-3	920-921-3			408			M	1	1	2

IMCS-13	922-922-6	922-922-6	S01 Y38 T660	Acrylic	462	231	231	M	5	5	5
IMCS-13	922-922-7	922-922-7			462			M	5	5	5
IMCS-14	923-924-6	923-924-6	S01 Y39 T660	Alkyd/Alkyd	805	382	422	M	2	3	2
IMCS-14	923-924-7	923-924-7			805			M	2	3	2
IMCS-15	925-925-6	925-925-6	S01 Y40 T660	Epoxy	790	395	395	M	3	3	3
IMCS-15	925-925-7	925-925-7			790			M	3	3	3
IMCS-16	927-928-929-6	927-928-929-6	S01 Y41 T660	Epoxy/Epoxy/Urethane	890	320/275	295	M	1	1	2
IMCS-16	927-928-929-7	927-928-929-7			890			M	1	1	2
IMCS-17	930-931-7	930-931-7	S01 Y42 T660	Alkyd/Alkyd	804	419	385	M	3	3	4
IMCS-17	930-931-8	930-931-8			804			M	3	3	4
IMCS-18	932-932-6	932-932-6	S01 Y43 T660	Epoxy	568	284	284	M	3	2.5	2
IMCS-18	932-932-7	932-932-7			568			M	3	2.5	2
IMCS-19	933-932-934-2	933-932-934-2	S01 Y44 T660	Zinc/Epoxy/Urethane	954	282/284	388	M	1.5	1	2
IMCS-19	933-932-934-3	933-932-934-3			954			M	1.5	1	2
IMCS-20	902-010-6	902-010-6	S01 Y48 T660	Epoxy Ester/Urethane	820	400	420	M	3	2.5	3
IMCS-20	902-010-4	902-010-4			820			M	3	2.5	3
NFS-01	301-201-4	301-201-4	W02 Y07 T650	Copolymer Latex/Acrylic Latex	1	1	0	W		5	4
NFS-01	301-201-6	301-201-6			1			W		2	4
NFS-05	322-206-4	322-206-4	W02 Y11 T650	Acrylic	250	115	135	W		2	2
NFS-05	322-206-6	322-206-6			250			W		2	2
NFS-09	325-210-4	325-210-4	W02 Y15 T650	Acrylic	0	0	0	W		2	3
NFS-09	325-210-6	325-210-6			0			W		2	3
NFS-12	328-213-5	328-213-5	W02 Y18 T650	Alkyd/Acrylic	597	350	247	W		2	2
NFS-12	328-213-6	328-213-6			597			W		2	2
NFS-15	331-237-3	331-237-3	W02 Y21 T650	Acrylic	500	250	250	W		3	3
NFS-15	331-237-5	331-237-5			500			W		3	3
NFS-18	332-217-3	332-217-3	W02 Y24 T650	Acrylic	500	250	250	W		1	1
NFS-18	332-217-5	332-217-5			500			W		1	1
QDNFS-01	111-218-6	111-218-6	W02 Y47 T650	Alkyd/Alkyd	570	400	170	W		4	4
QDNFS-01	111-218-8	111-218-8			570			W		4	4
QDS-01	101-102-3	101-102-3	W02 Y01 T650	Alkyd/Alkyd	840	440	400	W	5	5	5
QDS-01	101-102-5	101-102-5			840			W		5	5

QDS-03	109-110-4	109-110-4	W02 Y05 T650	Alkyd	850	450	400	W		5	5
QDS-03	109-110-6	109-110-6			850			W		5	5
QDS-04	111-111-112-3	111-111-112-3	W02 Y06 T650	Alkyd/Alkyd	1200	400/400	400	W		5	5
QDS-04	111-111-112-5	111-111-112-5			1200			W		5	5
NFS-21	334-203-1	334-203-1	W02 Y09 T650	Acrylic	0	0	0	W		3	3
NFS-21	334-203-5	334-203-5			0			W		3	3

* During the 18 month evaluation, these panels were determined to be unsuitable for outdoor exposure, and were not ranked.

SRD Legend

IMCS = Industrial Maintenance Coating System

NFS = Non Flat System

QDNFS = Quick Dry Non Flat System

QDS = Quick Dry Enamel System

Table B-5

NTS Field Study - 12, 18 and 24 Month TAC Ratings - El Segundo

SRD	12 Month Pictures SRN (Filename)	24 Month Pictures SRN (Filename)	NTS Number	Resin Type	System VOC	Primer VOC	Topcoat VOC	Substrate	12 Month Rating (1=best, 5=worst)	18 Month Rating (1=best, 5=worst)	24 Month Rating (1=best, 5=worst)
IMCS-01	901-901-4	901-901-4	S01 Y28 T660	Siloirxane	216	108	108	M	5	NA*	4
IMCS-01	901-901-6	901-901-6			216			M	5	NA*	4
IMCS-02	902-903-3	902-903-3	S01 Y27 T660	Epoxy Ester/Silicone	820	400	420	M	3	3.5	3
IMCS-02	902-903-4	902-903-4			820			M	3	3.5	3
IMCS-03	904-905-905-3	904-905-905-3	S01 Y28 T660	Zinc/Urethane	159	49	55/55	M	1	1	1
IMCS-03	904-905-905-4	904-905-905-4			159			M	1	1	1
IMCS-04	906-907-907-4	906-907-907-4	S01 Y29 T660	Acrylic/Acrylic	554	138	208/208	M	3	3	1
IMCS-04	906-907-907-5	906-907-907-5			554			M	3	3	1
IMCS-05	908-909-5	908-909-5	S01 Y31 T660	Acrylic/Acrylic	180	60	120	M	4	2.5	3
IMCS-05	908-909-6	908-909-6			180			M	4	2.5	3
IMCS-06	910-911-5	910-911-5	S01 Y30 T660	Epoxy/Urethane	0	0	0	M	2.5	4	4
IMCS-06	910-911-6	910-911-6			0			M	2.5	4	4
IMCS-07	912-913-913-5	912-913-913-5	S01 Y32 T666	Novolac	0	0	0	M	5	NA*	4
IMCS-07	912-913-913-4	912-913-913-4			0			M	5	NA*	4
IMCS-08	914-915-915-3	914-915-915-3	S01 Y33 T666	Butadiene-Epoxy/Urethane	0	0	0	M	2.5	3	2
IMCS-08	914-915-915-7	914-915-915-7			0			M	2.5	3	2
IMCS-09	914-916-916-5	914-916-916-5	S01 Y34 T660	Butadiene-Epoxy/Epoxy	0	0	0	M	4	3	2
IMCS-09	914-916-916-6	914-916-916-6			0			M	4	3	2
IMCS-10	917-918-4	917-918-4	S01 Y35 T660	Alkyd/Urethane Alkyd	828	417	411	M	3	2	2
IMCS-10	917-918-5	917-918-5			828			M	3	2	2
IMCS-11	919-919-5	919-919-5	S01 Y36 T660	Epoxy	340	170	170	M	4	3	4
IMCS-11	919-919-6	919-919-6			340			M	4	3	4
IMCS-12	920-921-5	920-921-5	S01 Y37 T660	Epoxy/Siloxane	408	288	120	M	1	1	1
IMCS-12	920-921-6	920-921-6			408			M	1	1	1

IMCS-13	922-922-2	922-922-2	S01 Y38 T660	Acrylic	462	231	231	M	5	5	4
IMCS-13	922-922-4	922-922-4			462			M	5	5	4
IMCS-14	923-924-3	923-924-3	S01 Y39 T660	Alkyd/Alkyd	805	382	422	M	2	4	4
IMCS-14	923-924-4	923-924-4			805			M	2	4	4
IMCS-15	925-925-4	925-925-4	S01 Y40 T660	Epoxy	790	395	395	M	3	4	4
IMCS-15	925-925-3	925-925-3			790			M	3	4	4
IMCS-16	927-928-929-3	927-928-929-3	S01 Y41 T660	Epoxy/Epoxy/Urethane	890	320/275	295	M	1	2	2
IMCS-16	927-928-929-4	927-928-929-4			890			M	1	2	2
IMCS-17	930-931-3	930-931-3	S01 Y42 T660	Alkyd/Alkyd	804	419	385	M	3	3	4
IMCS-17	930-931-4	930-931-4			804			M	3	3	4
IMCS-18	932-932-3	932-932-3	S01 Y43 T660	Epoxy	568	284	284	M	3	3.5	3
IMCS-18	932-932-5	932-932-5			568			M	3	3.5	3
IMCS-19	933-932-934-3	933-932-934-3	S01 Y44 T660	Zinc/Epoxy/Urethane	954	282/284	388	M	1.5	1.5	1
IMCS-19	933-932-934-5	933-932-934-5			954			M	1.5	1.5	1
IMCS-20	902-010-6	902-010-6	S01 Y48 T660	Epoxy Ester/Urethane	820	400	420	M	3	3	3
IMCS-20	902-010-3	902-010-3			820			M	3	3	3
NFS-01	301-201-1	301-201-1	W02 Y07 T650	Copolymer Latex/Acrylic Latex	1	1	0	W		3	2
NFS-01	301-201-3	301-201-3			1			W		3	2
NFS-05	322-206-1	322-206-1	W02 Y11 T650	Acrylic	250	115	135	W	P?	2	3
NFS-05	322-206-3	322-206-3			250			W	P?	2	3
NFS-09	325-210-1	325-210-1	W02 Y15 T650	Acrylic	0	0	0	W	P?	2	4
NFS-09	325-210-3	325-210-3			0			W	P?	2	4
NFS-12	328-213-1	328-213-1	W02 Y18 T650	Alkyd/Acrylic	597	350	247	W	1	2	2
NFS-12	328-213-3	328-213-3			597			W	1	2	2
NFS-15	331-237-6	331-237-6	W02 Y21 T650	Acrylic	500	250	250	W		2	4
NFS-15	331-237-8	331-237-8			500			W		2	4
NFS-18	332-217-6	332-217-6	W02 Y24 T650	Acrylic	500	250	250	W	1	1	1
NFS-18	332-217-8	332-217-8			500			W	1	1	1
QDNFS-01	111-218-3	111-218-3	W02 Y47 T650	Alkyd/Alkyd	570	400	170	W		3	4
QDNFS-01	111-218-5	111-218-5			570			W		3	4
QDS-01	101-102-6	101-102-6	W02 Y01 T650	Alkyd/Alkyd	840	440	400	W		5	5
QDS-01	101-102-8	101-102-8			840			W		5	5

QDS-03	109-110-3	109-110-3	W02 Y05 T650	Alkyd	850	450	400	W		5	5
QDS-03	109-110-1	109-110-1			850			W		5	5
QDS-04	111-111-112-8	111-111-112-8	W02 Y06 T650	Alkyd/Alkyd	1200	400/400	400	W		5	5
QDS-04	111-111-112-6	111-111-112-6			1200			W		5	5
NFS-21	334-203-6	334-203-6	W02 Y09 T650	Acrylic	0	0	0	W	P	2	3
NFS-21	334-203-8	334-203-8			0			W	P	2	3

* During the 18 month evaluation, these panels were determined to be unsuitable for outdoor exposure, and were not ranked.

SRD Legend

IMCS = Industrial Maintenance Coating System

NFS = Non Flat System

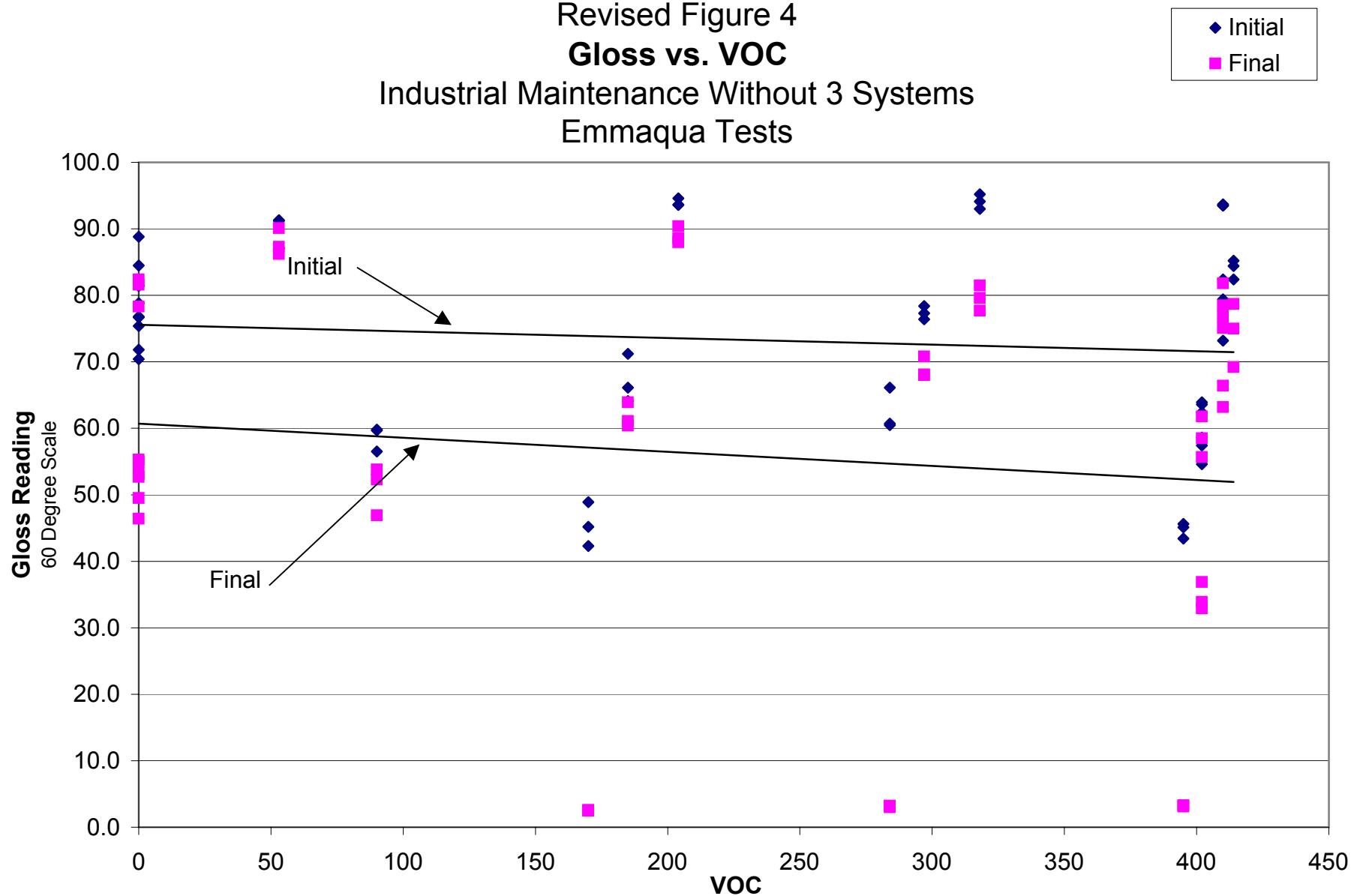
QDNFS = Quick Dry Non Flat System

QDS = Quick Dry Enamel System

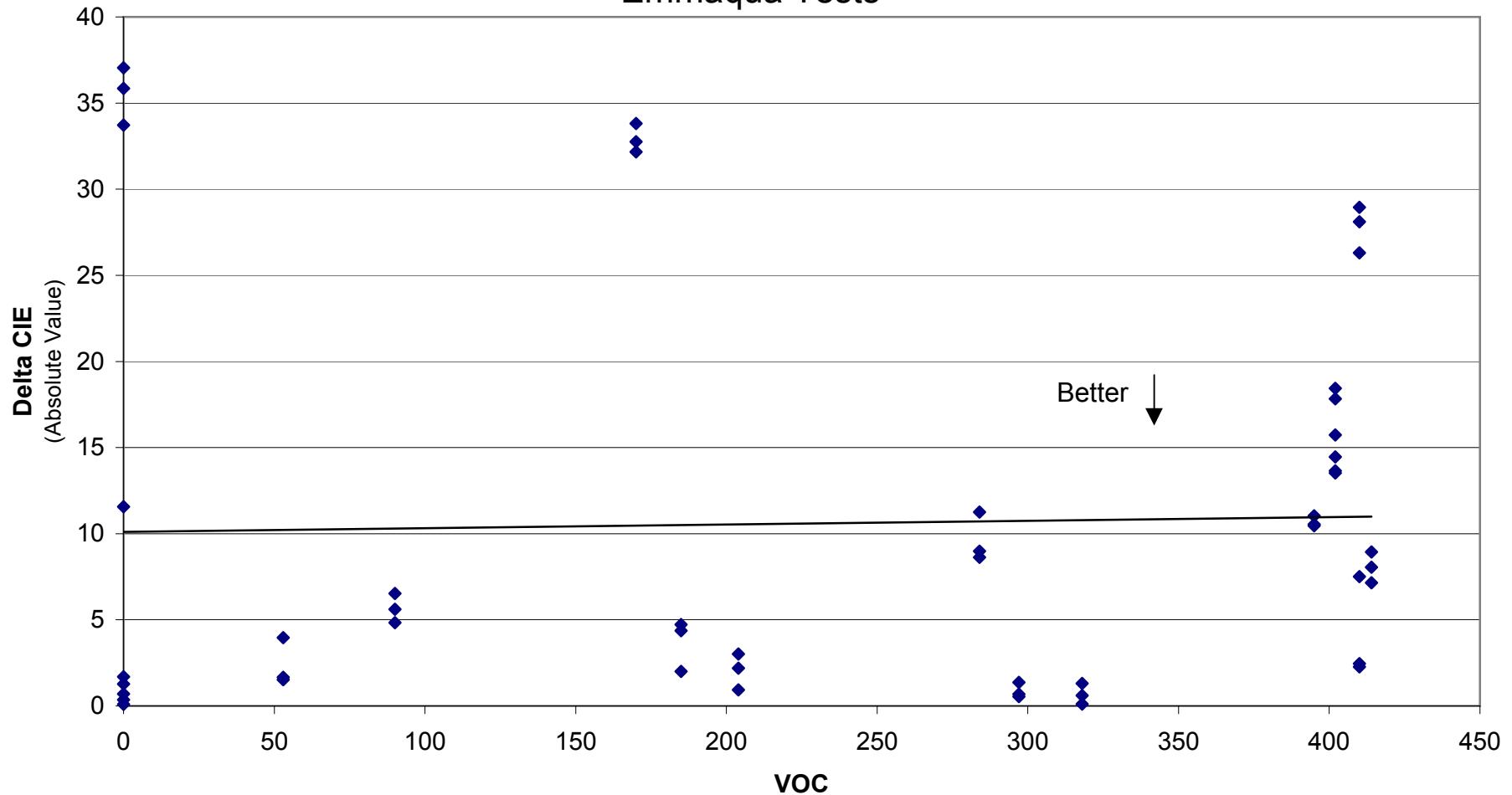
Appendix C

Revised Figures to Reflect Exclusion of Improperly Applied and Incorrectly Exposed IM Coatings

Revised Figure 4
Gloss vs. VOC
Industrial Maintenance Without 3 Systems
Emmaqua Tests



Revised Figure 5
Delta CIE Color vs. VOC
Industrial Maintenance Without 3 Systems
Emmaqua Tests

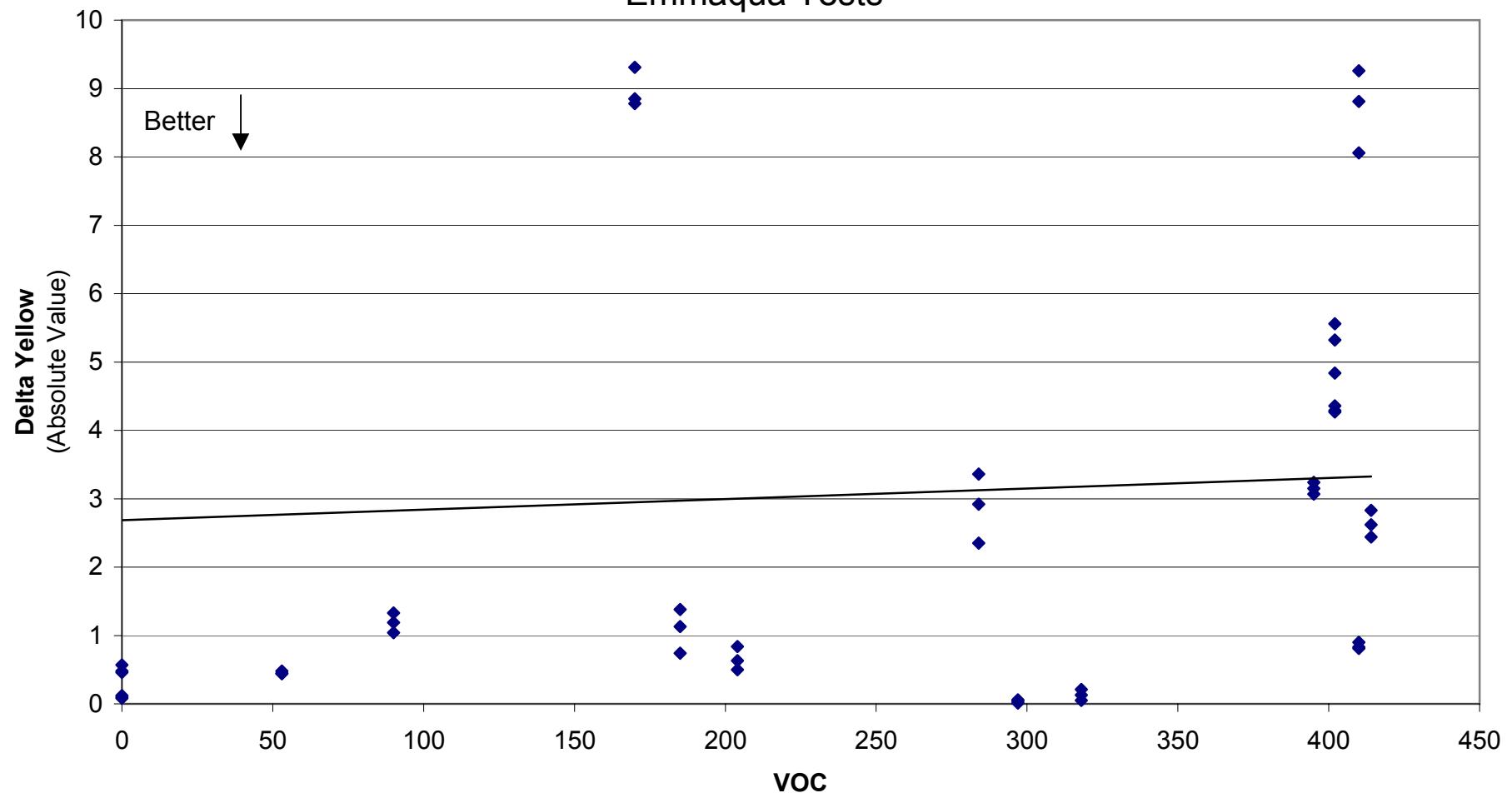


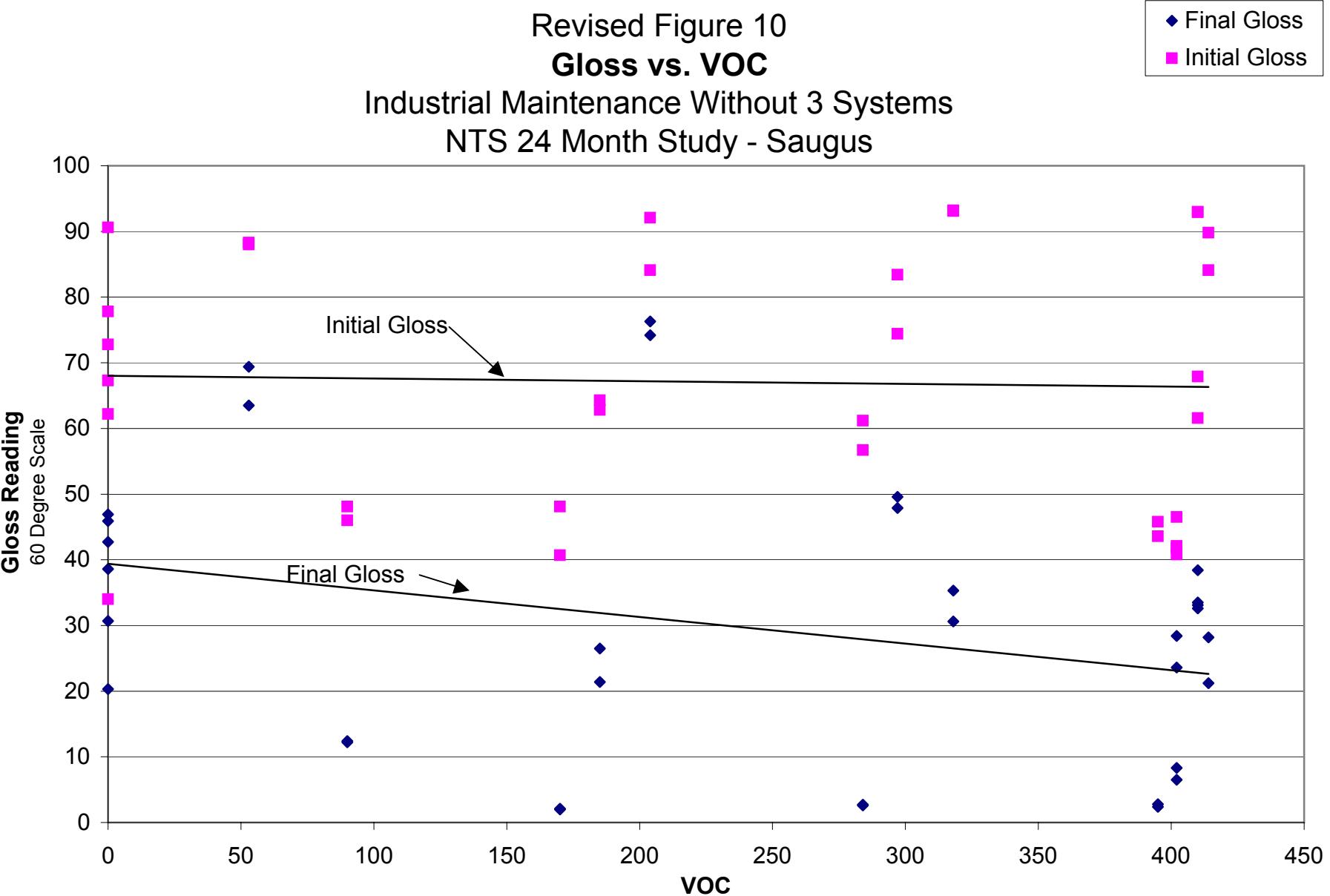
Revised Figure 6

Delta Yellow vs. VOC

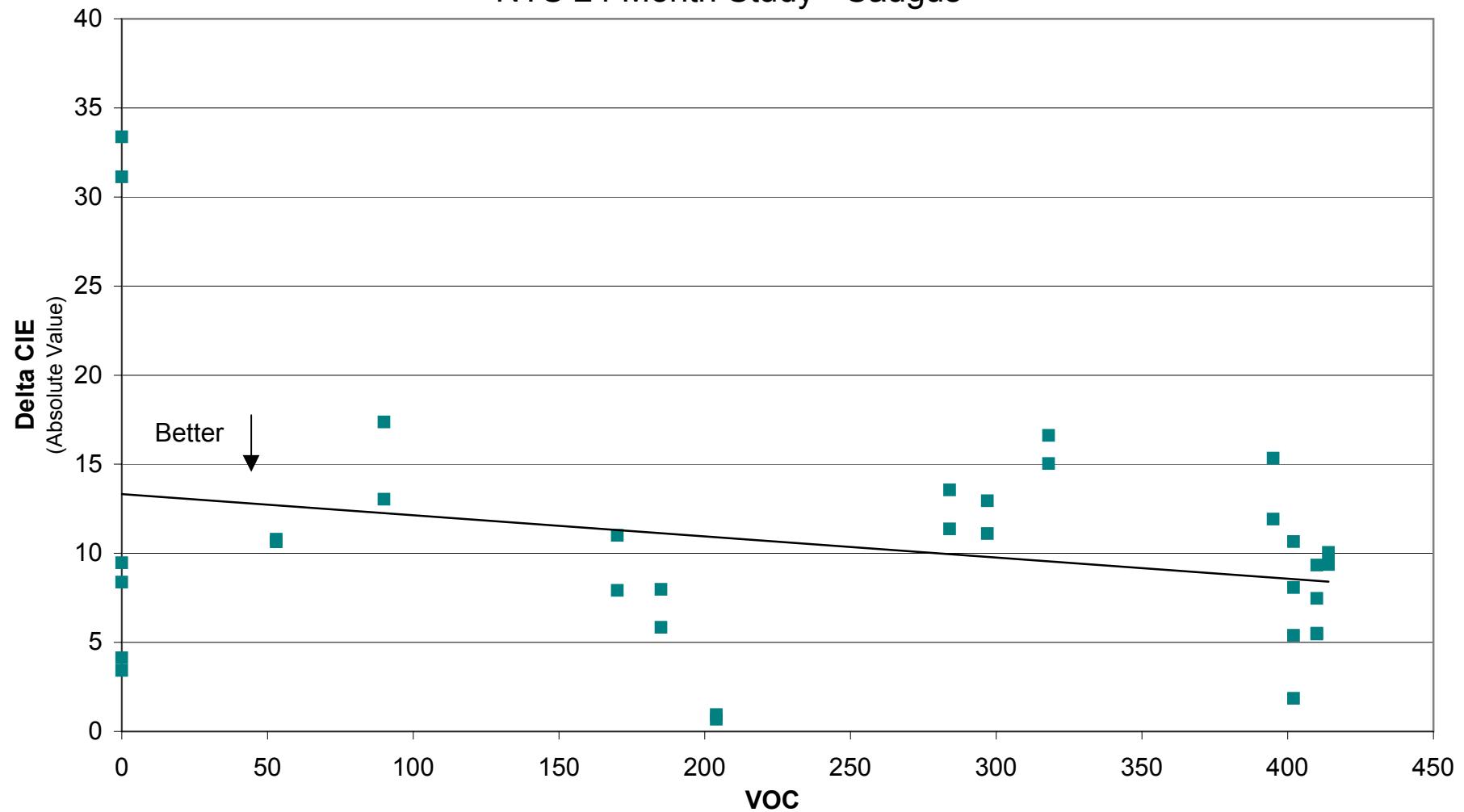
Industrial Maintenance Without 3 Systems

Emmaqua Tests

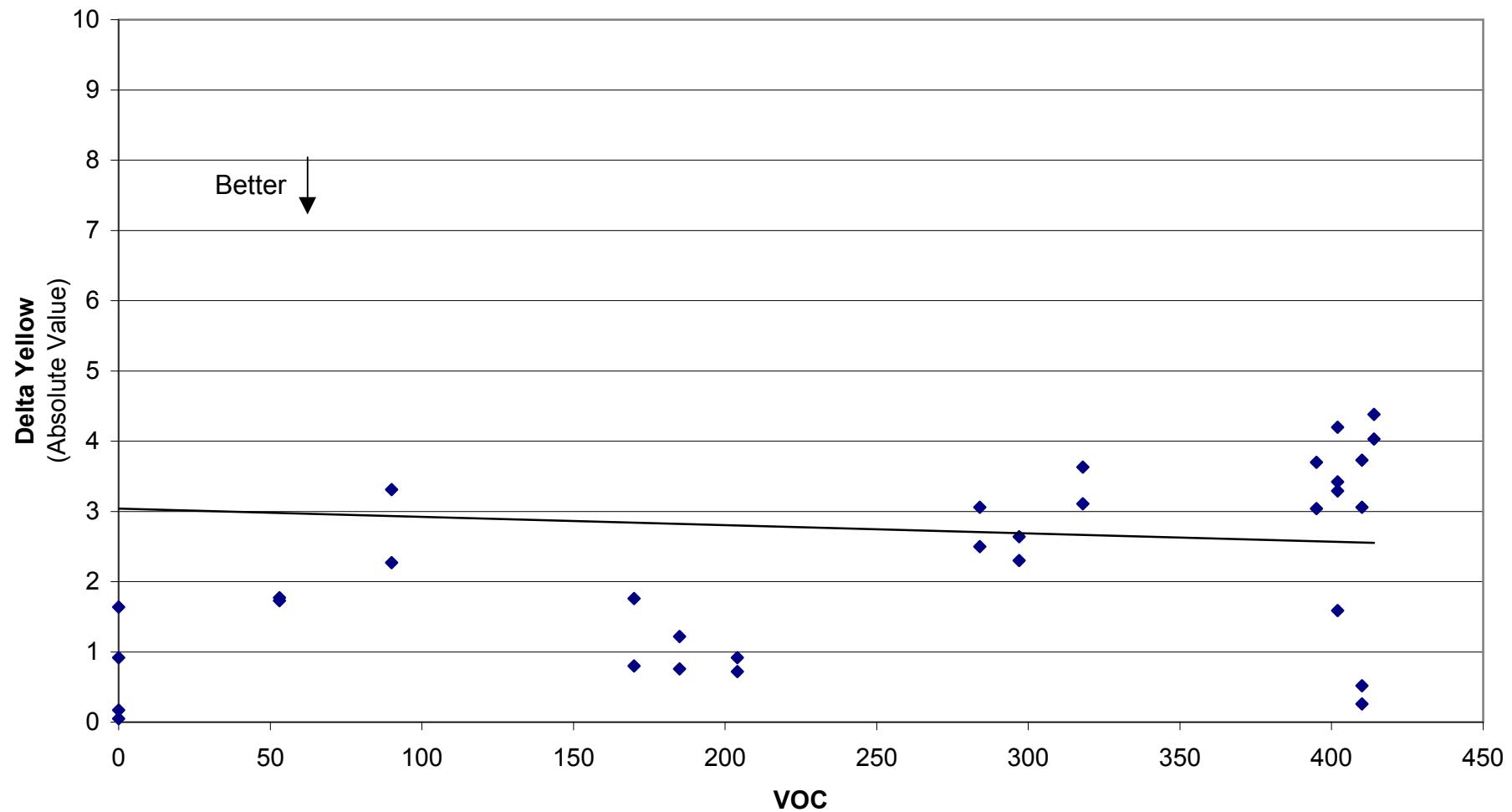




Revised Figure 11
Delta CIE Color vs. VOC
Industrial Maintenance Without 3 Systems
NTS 24 Month Study - Saugus

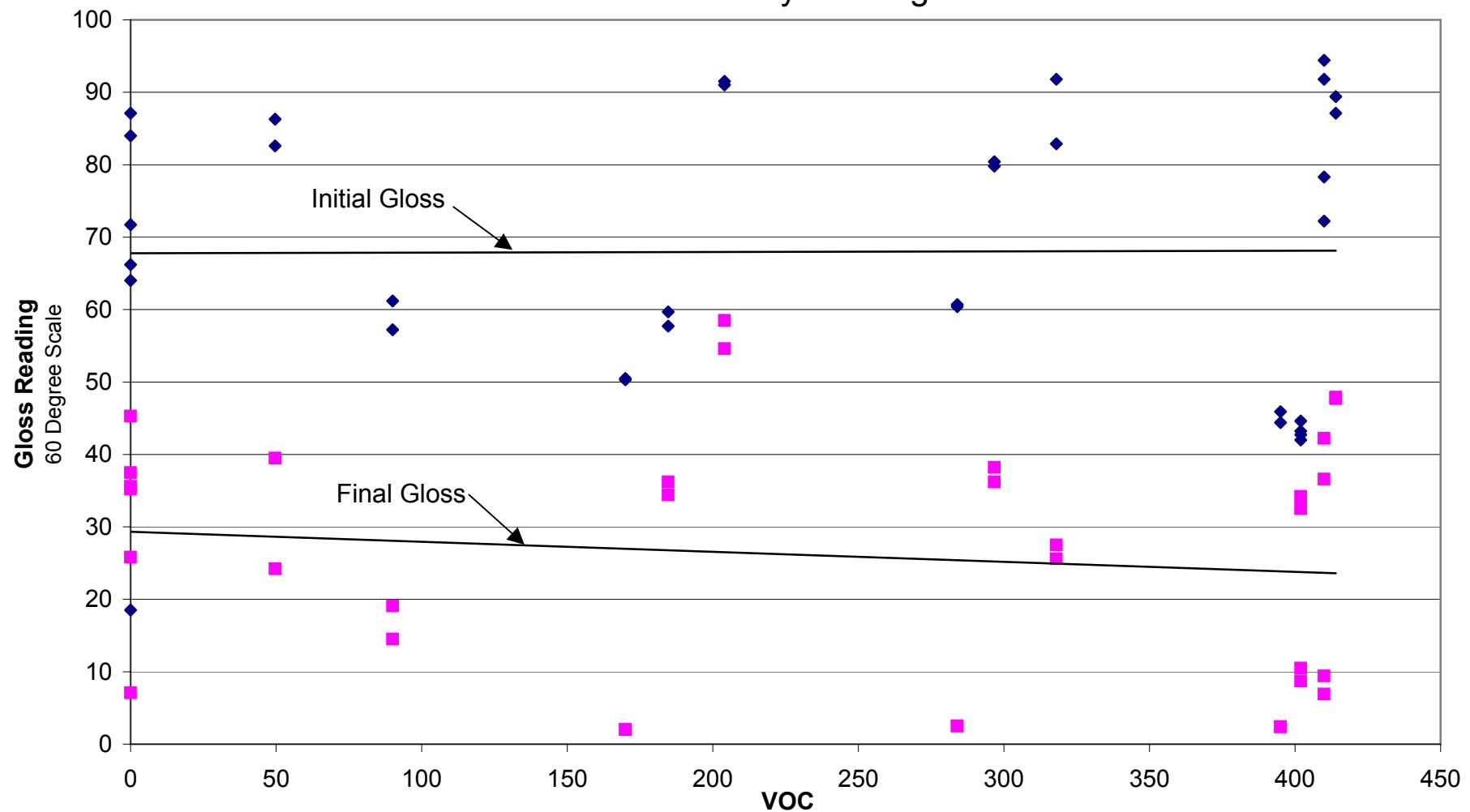


Revised Figure 12
Delta Yellow vs. VOC
Industrial Maintenance Without 3 Systems
NTS 24 Month Study - Saugus

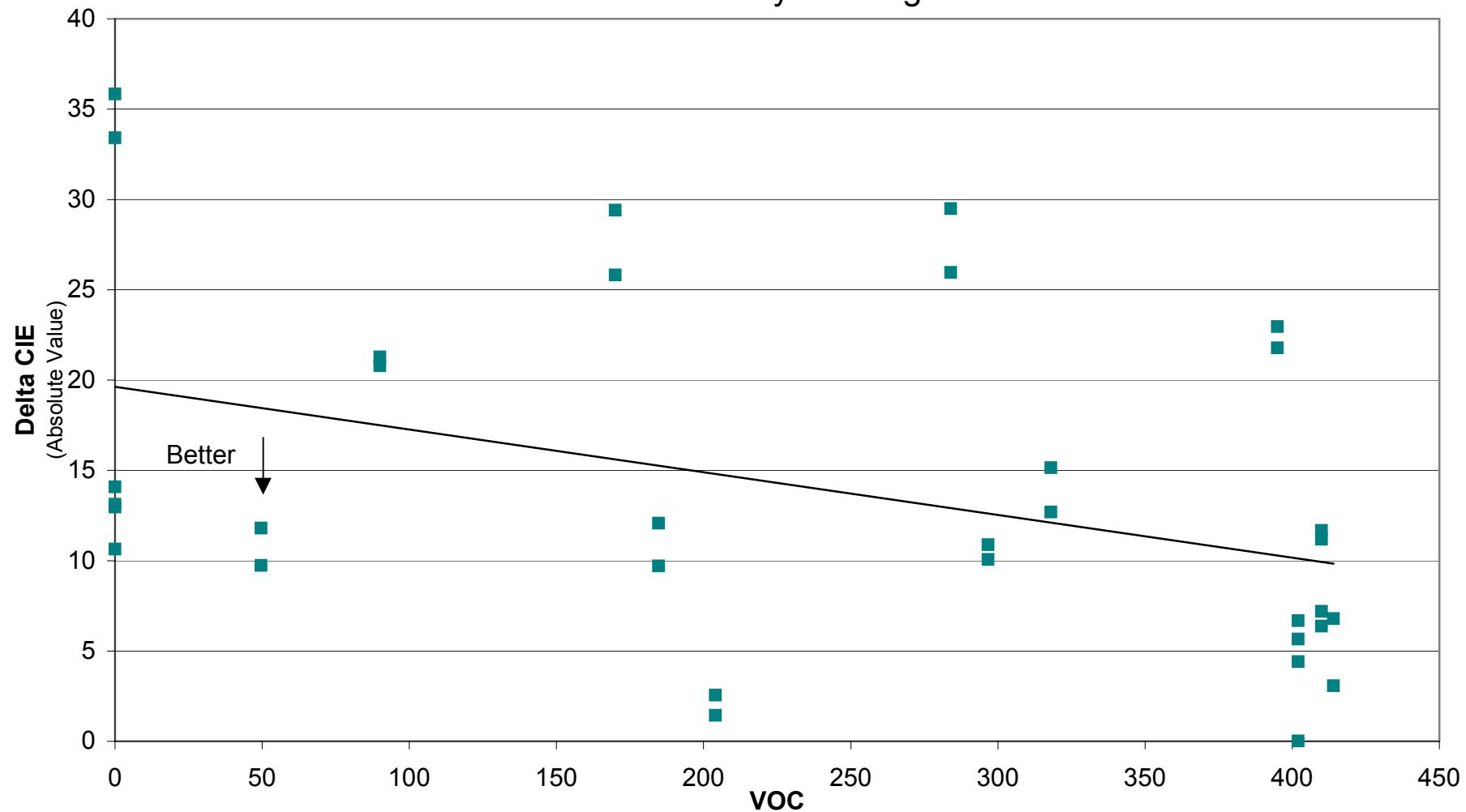


Revised Figure 16
Gloss vs. VOC
Industrial Maintenance Without 3 Systems
NTS 24 Month Study - El Segundo

◆ Initial Gloss
■ Final Gloss



Revised Figure 17
Delta CIE Color vs. VOC
Industrial Maintenance Without 3 Systems
NTS 24 Month Study - El Segundo



Revised Figure 18
Delta Yellow vs. VOC
Industrial Maintenance Without 3 Systems
NTS 24 Month Study - El Segundo

